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New data on scorpion diversity in the region of Khenchela, Algeria

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Abstract

Scorpions in the Khenchela region (northeast of Algeria) are almost neglected. That is why this study concerns the census of the scorpion fauna in this region. A monthly collecting of scorpions during the period from March 2015 to February 2016 in three biotopes (edge of a dam, palm grove, and pine forest) of 3 districts (Babar, Chechar, and El-Hamma), resulted in the capture of 76 adults. Four species of scorpions were identified: *Androctonus australis*, *Buthus aures*, *B. tunetanus* (Family Buthidae), and *Scorpio maurus* (Family Scorpionidae).

Keywords: palm grove, forest, dam, biotope, Khenchela, Algeria.

Introduction

Scorpions are part of phylum Arthropoda, class Arachnida (Heurtault *et al.*, 1999). They are generally found in dry, hot environments, although some species also occur in forest and wet savannas (Bawaskar & Bawaskar, 2012). Scorpions are nocturnal, fearful in nature, not very aggressive and lucifugous (Goyffon & El Ayeb, 2002). They show remarkable adaptation to different biotopes (Vial & Vial, 1974). They can live under stones, in small cavities in the soil, in sand and under tree barks (Vachon, 1952). The life span of the scorpions is variable and can be extremely long (Lourenço, 2000). They are thermophilic species (Soulaymani *et al.*, 1999). The anatomy of scorpions is unusual among the Arachnida. In addition to the claw-like pedipalps, 5-segmented postabdomen (metasoma) and stinger segment (telson), scorpions also have four pairs of walking legs, a pair of jointed and claw-like chelicerae (Richman, 2008).

The venom of scorpions is used for both prey capture, defence and possibly to subdue mates (Gouge & Olson, 2001). In Algeria, 28 species and 14 genera of scorpions, classified under three families Buthidae, Euscorpiidae, and Scorpionidae were identified (Selmane *et al.*, 2014) and scorpion envenomation is a real public health problem (Benguedda *et al.*, 2002). In 2010, more than 45.000 sting cases causing the death of 69 persons were recorded (Hellal *et al.*, 2012). However, there are enormous gaps in the knowledge of scorpion fauna in northern Algeria (Sadine *et al.*, 2012), including the

region of Khenchela. Therefore, our work aims to assess the scorpion diversity in the Khenchela region, distributed through three different biotopes.

Material and Methods

This study was conducted in the region of Khenchela (northeast of Algeria) (Fig. 1, after Dalet (2017a, b)). Sampling was carried out randomly by capturing scorpions monthly between March 2015 and February 2016, in three selected biotopes (Fig. 2, Table 1): pine forest (natural environment), palm grove (anthropogenic environment) and the edge of a dam (wetland) (Fig. 2) in 3 districts (Babar, Chechar, and El-Hamma).

Scorpions were collected from various micro-habitats such as under stones, between grasses and under the debris of plants. Each individual was initially put alone in a box to avoid cannibalism, before storing it in 70% ethanol until it was determined.

The identification of the individuals collected was made using the key of Vachon (1952) and the description of Lourenço & Sadine (2016); this was confirmed by Dr. Sadine Salah Eddine (University of Ghardaia, Algeria).

Fig. 1. Map of the study region: Khenchela, Algeria (After Dalet, 2017a, b).

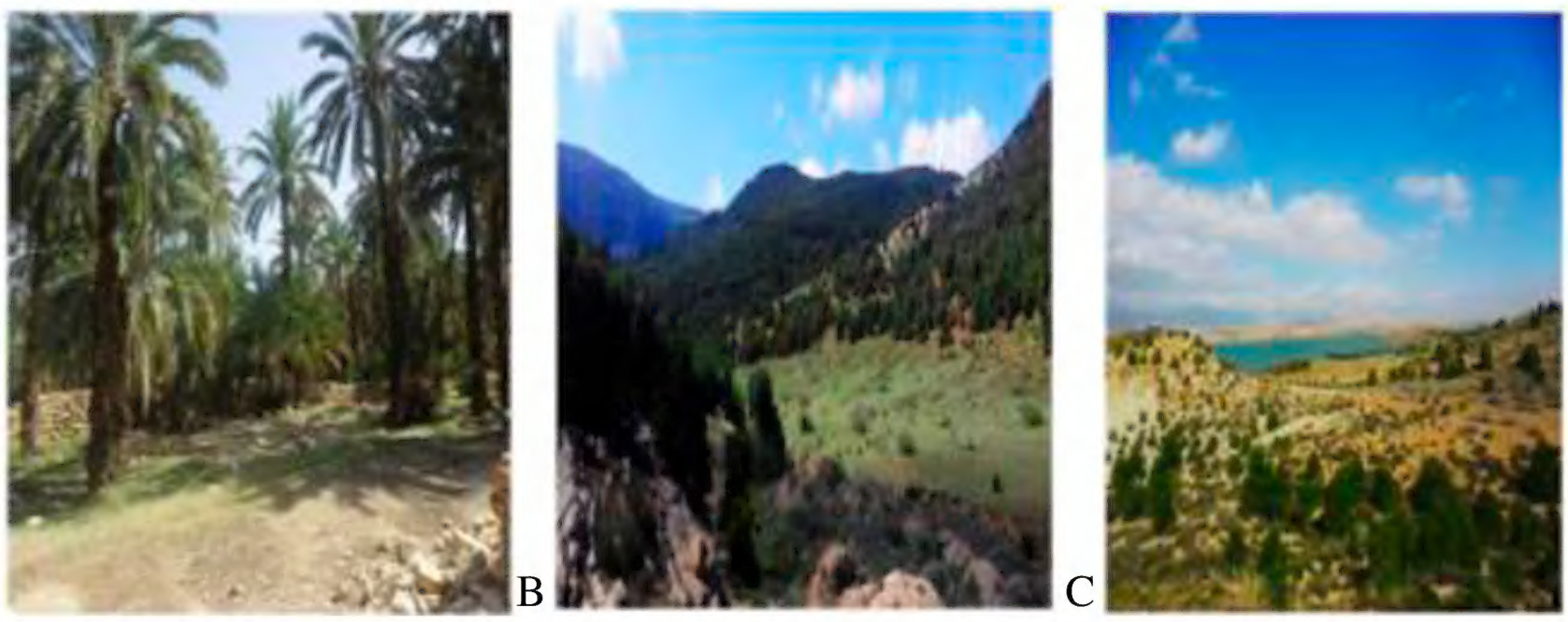

Fig. 2. Studied biotopes. A. Palm grove. B. Forest. C. Edge of a dam.

Table 1. Description of the three selected biotopes.

Biotope	Geographical coordinates	Altitude	District
Edge of a dam	35°10’09”N, 7°06’05”E	950 m	Babar
Forest	35°27’49”N, 7°04’57”E	980 m	El-Hamma
Palm grove	35°02’17”N, 7°00’15”E	1160 m	Chechar

Results and Discussion

Over a period of twelve months, 76 adult scorpions were captured. They belong to family Buthidae: genera *Androctonus* and *Buthus*, and family Scorpionidae: genus *Scorpio*. The forest was the richest biotope quantitatively (it represented almost 50% of collected individuals) and qualitatively (it hosted the four scorpion species).

The four identified species are:

Androctonus australis (Linnaeus, 1758)

It is a big yellow species (Fig. 3) (Goyffon & El Ayeb, 2002). In the present study, *A. australis* was the most widespread species in the study area, particularly in the palm grove (Table 2).

A. australis occupies a large area in northern Saharan Africa, from Algeria in the west to Egypt in the east (Goyffon, 2002). In Algeria, it has been found in some regions of the south (Sadine *et al.*, 2011; Sadine, 2012) and in other biotopes in Khenchela (Meddour *et al.*, 2017). It is important to note that *A. australis* is responsible on several fatal accidents each year in Algeria and Tunisia, and this has been recently reported in Morocco (Touloun *et al.*, 2014).

Buthus aures Lourenço & Sadine, 2016

A scorpion of moderate to large size, its colouration is basically yellow to orange-yellowish (Fig. 4) (Lourenço & Sadine, 2016). In our case, it has occupied two biotopes, *i.e.* forest and dam (Table 2). Furthermore, it was found in mountain and steppe biotopes in the region of Khenchela (Meddour *et al.*, 2017).

Buthus tunetanus (Herbst, 1800)

Adults are 60-80 mm long (Kovařík, 2006) and straw-coloured (Fig. 5) (Vachon, 1952). In the studied biotopes, *B. tunetanus* was a species quite common especially in the forest (Table 2). In North Africa, *B. tunetanus* has been reported in Algeria (Sadine, 2012), in Tunisia (Kovařík, 2006), and in Libya (Rossi *et al.*, 2013).

Scorpio maurus Linnaeus, 1758

A scorpion of 50-70 mm long and reddish brown coloured (Fig. 6) (Vachon, 1952). It should be noticed that the number of captured individuals belonging to this species was the lowest in the study area. *S. maurus* was caught in the forest biotope only (Table 2). For almost a century, it has been considered to be no more than a widespread and presumably highly polymorphic species (Lourenço & Cloudsley-Thompson, 2012). It was recently identified in Algeria by Sadine *et al.* (2011 & 2012). While in the Mediterranean and the Middle East regions, it was also found in Turkey (Karataş & Çolak, 2005) and in Saudi Arabia (Al-Asmari *et al.*, 2007).

Conclusion

Four species of scorpions colonized forest, the edge of a dam, and palm grove biotopes in the Khenchela region. Of these species, that belong to two families and three genera, *Androctonus australis* was the most abundant species. The forest was the most varied and the most colonized biotope, with the presence of the four identified species and almost the half of captured individuals. Further studies are required to identify living scorpions in other biotopes in Khenchela area and to know about their bio-ecology.

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Fig. 3. *Androctonus australis*. Fig. 4. *Buthus aures.*

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Fig. 5. *Buthus tunetanus.* Fig. 6. *Scorpio maurus.*

Table 2. Species of scorpions caught in three different biotopes of the Khenchela region.

Families	Species	Number of individuals by biotope		
		Palm grove	Dam	Forest
Buthidae C.L. Koch, 1837	*Androctonus australis* (Linnaeus, 1758)	26	0	1
	Buthus aures (Lourenço & Sadine, 2016)	0	8	10
	Buthus tunetanus (Herbst, 1800)	3	2	16
Scorpionidae Latreille, 1802	*Scorpio maurus* Linnaeus, 1758	0	0	10
Total	4	29	10	37

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A new record and notes on wolf spiders from Cappadocia Region (Nevşehir) of Turkey (Araneae: Lycosidae)

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Abstract

Eighteen species belonging to family Lycosidae are recorded for the first time from Cappadocia Region (Nevşehir) of Turkey. *Alopecosa striatipes* (C.L. Koch, 1839) is identified as a new record for the Turkish araneofauna. Its morphology is briefly described and illustrated.

Keywords: Araneae, Lycosidae, fauna, new record, Nevşehir, Turkey.

Introduction

Lycosidae is currently known as one of the largest spider families with 2421 species belonging to 124 genera in the world (World Spider Catalog, 2018). It is represented by 87 species classified in 15 genera in Turkey (Bayram *et al.*, 2017; Demir *et al.*, 2017; Topçu *et al.*, 2005). Demircan and Topçu (2011) had contributed with new records to lycosid fauna of Central Anatolia Region. Also, Koçyiğit *et al.* (2016) added a lycosid species to the list from Hasan Mountain.

In this study, 18 species were recorded for the first time from Cappadocia Region (Central Anatolia) of Turkey. *Alopecosa striatipes* (C.L. Koch, 1839) is identified as a new record for the Turkish araneofauna. Therefore, the known species of genus *Alopecosa* is raised to 14 in Turkey and the total number of lycosid species recorded from Turkey is now 88 species.

Material and Methods

This study is based on material collected between 2002 and 2004 from the Cappadocia Region of Turkey (Nevşehir). Totally, 18 species were recorded for the first time from Cappadocia Region of Turkey. One of them is recorded for the first time from Turkey. The specimens were preserved in 70% ethanol. SZX16 Olympus binocular stereomicroscope was used for drawing and identification. Examined specimens were deposited in the Arachnology Museum of Niğde Ömer Halisdemir University

(NOHUAM). The total number of species were summarized in Table (1). Identification of *Alopecosa striatipes* (C.L. Koch, 1839) depended on Roberts (1998) and other references listed by Nentwig *et al*. (2018). World distribution of the species follows the World Spider Catalog (2018).

Results

A total of 93 adult specimens were collected among 179 lycosid samples from the research region. They were identified as 18 species belonging to 7 genera. *Alopecosa striatipes* is a new record for the Turkish spider fauna. A list of studied taxa with localities and dates of collecting is given below.

Alopecosa Simon, 1885

Alopecosa cuneata (Clerck, 1757)

Material examined: 1♀, 1♂, Nevşehir province, Merkez district, 1190 m, 01.VII.2003; 1♀, Avanos district, 1150 m, 12.VIII.2004.
World distribution: Europe, Turkey, Caucasus, Russia to Kazakhstan, China.

Alopecosa cursor (Hahn, 1831)

Material examined: 1♀, Nevşehir province, Derinkuyu district, 1200 m, 12.VI.2003; 1♀, Ürgüp district, 1170 m, 12.VIII.2003; 1♀, Avanos district, Göreme town, 1150 m, 12.VIII.2003; 1♂, Gülşehir district, 1100 m, 10.VIII.2003.
World distribution: Europe, Turkey, Caucasus, Russia to Central Asia, China.

Alopecosa fabrilis (Clerck, 1757)

Material examined: 1♂, Nevşehir province, Derinkuyu district, 1200 m, 22.X.2003; 1♀, Derinkuyu district, 1200 m, 25.IX.2003. 1♀, Avanos district, 1150 m, 04.V.2003. 1♀, Derinkuyu district, 1200 m, 11.VII.2003. 1♀, Derinkuyu district, 1200 m, 24.VI.2003. 1♀, Avanos district, 1150 m, 06.VII.2003. 1♀, Derinkuyu district, 1200 m, 24.VIII.2003. 1♀, Derinkuyu district, 1200 m, 10.VIII.2003. 1♀, Avanos district, 1150 m, 24.V.2004. 1♂, Gülşehir district, 1100 m, 15.VIII.2004; 1♂, Acıgöl district, 1190 m, 31.VII.2004; 1♂, Gülşehir district, 1100 m, 12.VIII.2004. 1♂, Avanos district, 1150 m, 12.VIII.2002.
World distribution: Europe, Turkey, Russia to Central Asia, China.

Alopecosa farinosa (Herman, 1879)

Material examined: 1♀, Nevşehir province, Merkez district, 1190 m, 01.VII.2003; 1♂, Gülşehir district, 1100 m, 15.IX.2004.
World distribution: Europe, Turkey, Caucasus, Russia, Kazakhstan.
Note. This species was misidentified as *Alopecosa accentuata* (Latreille, 1817), a *nomen dubium*, and mentioned under this name in: Topçu *et al.* (2005), Bayram *et al.* (2017), and Demir *et al*. (2017).

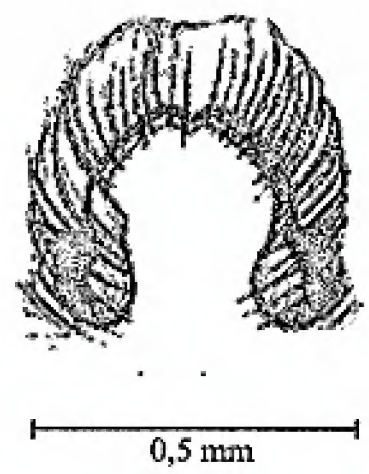

Fig. 1. *Alopecosa striatipes* (C.L. Koch, 1839), female epigyne, ventral view.

Alopecosa striatipes (C.L. Koch, 1839)

Material examined: 1♀, Nevşehir province, Gülşehir district, 1100m, 12.IX.2003.
World distribution: Europe to Central Asia.
Description: Body length 12 mm; prosoma and opisthosoma brown, laterally with dark longitudinal stripes; legs yellowish brown; broad epigynal area with 2 obvious spermathecae (Fig. 1).

Arctosa C.L. Koch, 1847

Arctosa perita (Latreille, 1799)

Material examined: 1♀, Nevşehir province, Kozaklı district, 1200 m, 15.V.2003.
World distribution: Europe, North Africa, Turkey, Caucasus, Russia. Introduced to Canada.

Geolycosa Montgomery, 1904

Geolycosa vultuosa (C.L. Koch, 1838)

Material examined: 1♀, Nevşehir province, Avanos district, Çalış village, 1150 m, 02.IV.2002; 1♀, Derinkuyu district, 1200 m, 21.VIII.2002; 1♀, Derinkuyu district, 1200 m, 06.VII.2002; 1♂, Merkez district, Nar village, 1190 m, 07.IX.2003; 1♂, Derinkuyu district, 1200 m, 25.III.2003; 1♀, Acıgöl district, 1190, 16.V.2003; 1♀, Avanos district, 1150m, 13.X.2003; 1♀, Gülsehir district, 1100 m, 01.VII.2003; 1♂, Derinkuyu district, 1200m, 22.VIII.2003; 1♀, Merkez district, Nar village, 1190 m, 09.VII.2003; 1♀, Derinkuyu district,1200 m, 12.VIII.2004; 1♀, Derinkuyu district, 1200 m, 12.VIII.2004; 1♂, Derinkuyu district, 1200 m, 12.IX.2004; 1♀, Derinkuyu district, 1200 m, 26.III.2004.
World distribution: South-eastern Europe to Central Asia.

Hogna Simon, 1885

Hogna radiata (Latreille, 1817)

Material examined: 1♂, Nevşehir province, Gülşehir district, 1100 m, 10.V.2002; 1♀, Acıgöl district, Tatların village, 1190 m, 14.VIII.2002; 1♂, Acıgöl district, 1190 m, 10.IX.2002; 2♂, Ürgüp district, Yaşarbaba village, 1170 m, 27.VII.2003; 1♀, Merkez district, 1190 m, 10.V.2003; 1♂, Derinkuyu district, 1200 m, 10.V.2003; 1♀, 1♂, Avanos district, Çavuşin village, 1150 m, 05.VI.2003; 1♀, Avanos district, 1150 m, 06.VIII.2004; 1♀, Avanos district, 1150 m, 12.VIII.2004; 1♀, Avanos district, İsabeyli village, 1150 m, 10.VIII.2003; 1♀,1♂, Merkez district, 1190 m, 01.VII.2003; 1♂, Avanos district, Çavuşin village, 1150 m, 12.VIII.2003; 1♀, Avanos district, Uçhisar village, 1190 m, 27.VIII.2004; 1♂, Gülşehir district, 1100 m, 23.IV.2003; 1♀, Ürgüp district, 1170 m, 15.VIII.2003; 1♀, Derinkuyu district, 1200 m, 10.VIII.2004.
World distribution: Europe to Central Asia.

Lycosa Latreille, 1804

Lycosa praegrandis C.L. Koch, 1836

Material examined: 1♀, Nevşehir province, Derinkuyu district, 1200 m, 06.VII.2003; 1♀, Avanos district, Paşabağı village, 10.V.2003. 1♀, Avanos district, 1150 m, 20.VIII.2003; 1♀, Avanos district, Paşabağı village, 10.VIII.2003; 1♀, Avanos district, Derinöz, 08.VIII.2003.
World distribution: Greece to Central Asia.

Lycosa singoriensis (Laxmann, 1770)

Material examined: 1♀, Nevşehir province, Avanos district, 1150 m, 03.08.2002; 1♀, Avanos district, 1150 m, 03.08.2004; 1♂, Avanos district, Çavuşin village, 1150m, 12.08.2003.
World distribution: East Europe, Turkey, Caucasus, Russia to Central Asia, China, Korea.

Lycosa tarantula (Linnaeus, 1758)

Material examined: 1♂, Nevşehir province, Avanos district, 1150 m, 25.V.2003; 1♂, Derinkuyu district, 1200 m, 08.VI.2003; 1♂, Derinkuyu district, 1200 m, 04.VII.2003; 1♀, Merkez district, Nar village, 1190 m, 12.VIII.2003; 1♀, Avanos district, Bozca village, 1150 m, 24.VIII.2003; 1♀, Ürgüp district, Yaşarbaba village, 1170 m, 01.VI.2004.

World distribution: South-eastern Europe, Mediterranean, Near East.

Table 1. The total number of specimens caught and identified from the research region.

Species	Female	Male	Juvenile	Total
Alopecosa cuneata (Clerck, 1757)	2	1	1	4
Alopecosa cursor (Hahn, 1831)	3	1	1	5
Alopecosa fabrilis (Clerk, 1757)	8	5	12	25
Alopecosa farinosa (Herman, 1879)	1	1	-	2
Alopecosa striatipes (C.L. Koch, 1839)	1	-	-	1
Arctosa perita (Latreille, 1799)	1	-	-	1
Geolycosa vultuosa (C.L. Koch, 1838)	9	4	16	29
Hogna radiata (Latreille, 1817)	10	8	18	36
Lycosa praegrandis C.L. Koch, 1836	2	1	3	6
Lycosa singoriensis (Laxmann, 1770)	1	1	2	4
Lycosa tarantula (Linnaeus, 1758)	3	3	19	25
Pardosa agrestis (Westring, 1861)	1	1	1	3
Pardosa hortensis (Thorell, 1872)	1	-	-	1
Pardosa nebulosa (Thorell, 1872)	1	1	1	3
Pardosa proxima (C.L. Koch, 1847)	12	1	10	23
Trochosa hispanica Simon, 1870	2	3	1	6
Trochosa ruricola (De Geer, 1778)	1	1	1	3
Trochosa spinipalpis (F.O. Pickard-Cambridge, 1895)	1	1	-	2
	60	33	86	179

Pardosa C.L. Koch, 1847

Pardosa agrestis (Westring, 1861)

Material examined: 1♂, Nevşehir province, Kozaklı district, 1100 m, 22.VI.2003; 1♀, Nevşehir province, Kozaklı district, 1100 m, 12.VII.2003.

World distribution: Europe, Caucasus, Russia to Central Asia, China.

Pardosa hortensis (Thorell, 1872)

Material examined: 1♀, Nevsehir province, Derinkuyu district, 1200 m, 15.VI.2002.

World distribution: Europe, Turkey, Caucasus, Russia, Japan.

Pardosa nebulosa (Thorell, 1872)

Material examined: 1♀, Nevşehir province, Derinkuyu district, 1200 m, 15.VI.2003; 1♂, Kozaklı district, 1100 m, 22.VI.2003.

World distribution: South-eastern Europe, Turkey, Caucasus, Russia to Central Asia, China.

Pardosa proxima (C.L. Koch, 1847)

Material examined: 1♀, Nevşehir province, Derinkuyu district, Til village, 1200 m, 12.VI.2003; 1♀, Turkey, Acıgöl district, 1190 m, 22.V.2003; 1♀, Gülşehir district, 1100 m, 10.VII.2002; 1♀, Avanos district, Bozca village, 1150 m, 16.IX.2003; 1♀, Avanos

district, 1150 m, 10.VIII.2003; 1♀, Acıgöl district, 1190 m, 10.VIII.2002; 1♀, Derinkuyu district, Suvermez village, 1200 m, 10.VII.2002; 1♀, Avanos district, 1150 m, 25.VII.2004; 1♀, Avanos district, 1150 m, 15.VIII.2003; 1♀, Avanos district, 1150 m, 05.VIII.2003; 1♀, Avanos district, 1150 m, 04.VII.2003; 1♂, Avanos district, Göreme village, 1150 m, 12.II.2003; 1♀, Derinkuyu district, 1200 m, 12.VI.2003.
World distribution: Macaronesia, Europe, Russia, China.

Trochosa C.L. Koch, 1847

Trochosa hispanica Simon, 1870

Material examined: 1♂, Nevşehir province, Derinkuyu district, 1200 m, 10.V.2003; 1♂, Turkey, Avanos district, Çavuşin village, 1150 m, 05.VI.2003.
World distribution: Mediterranean to Central Asia, Iran.

Trochosa ruricola (De Geer, 1778)

Material examined: 1♀, Nevşehir province, Derinkuyu district, 1200 m, 05.VII.2004; 1♂, Derinkuyu district, 1200 m, 22.X.2003.
World distribution: Europe to China, Japan, Korea. Introduced to North America, Cuba, Puerto Rico, Bermuda.

Trochosa spinipalpis (F.O. Pickard-Cambridge, 1895)

Material examined: 1♂, Nevşehir province, Gülşehir district, 1100 m, 12.VIII.2004; 1♀, Derinkuyu, 1200 m, 11.VII.2003.
World distribution: Europe, Caucasus, Russia, China, Japan; and Turkey (Koçyiğit *et al.*, 2016).

In this study, 179 samples belonging to family Lycosidae were collected from the research region. *Alopecosa striatipes* (C.L. Koch, 1839) is identified as a new record for the Turkish araneofauna. Therefore, the known species of genus *Alopecosa* is raised to 14 in Turkey and the total number of lycosid species recorded from Turkey is now 88 species.

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A contribution to the jumping spider fauna in Hatay province of Turkey (Araneae: Salticidae)

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Abstract

In this study, jumping spider fauna of Hatay was investigated and 26 species belonging to 17 genera were identified. Investigated samples were collected from various localities in the region between April 2002 and August 2003. Systematic and faunistic data of these species were recorded in the study.

Keywords: Spiders, Araneae, Salticidae, Hatay, Turkey.

Introduction

The jumping spiders of family Salticidae are characterized by the square fronted carapace, with four large, forward-facing eyes, a smaller pair on each side further back, and a scarcely visible pair on each side between front and rear eyes. Family Salticidae contains 6064 species from 633 genera worldwide (World Spider Catalog, 2018). According to literature data, family Salticidae seems to be one of the most recorded taxa of Turkish spiders with 143 species and 40 genera (Topçu *et al.*, 2005; Bayram *et al.*, 2017; Demir & Seyyar, 2017). However, the fauna of jumping spiders in Turkey should be considered poorly known until now. The aim of this study is to contribute to the jumping spider fauna of Hatay Province of Turkey.

Material and Methods

The specimens were collected from Hatay province of Turkey between April 2002 and August 2003 from plants and by means of a hand aspirator from under stones and preserved in 70% ethanol. Examined specimens were deposited in the Arachnology Museum of Niğde Ömer Halisdemir University (NÖUAM). The identification was made by means of a SZX9 Olympus binocular stereomicroscope.

Results

In this study, 167 specimens of different families of spiders were collected from different locations in Hatay province. Among those samples, 29 of them belong to family Salticidae, within which 17 different genera and 26 species were identified.

Genus ***Aelurillus*** Simon, 1884
Aelurillus aeruginosus (Simon, 1871)
Material examined: 2♂, Dörtyol District, Karakese plateau, (36°49'24.7"N 36°14'56.4"E), 172m, 24.07.2002.
World distribution: Mediterranean.

Genus ***Ballus*** C.L. Koch, 1850
Ballus chalybeius (Walckenaer, 1802)
Material examined: 1♀, İskenderun District, Aşkarbeyli neighborhood, (36°33'48.1"N 36°13'02.6"E), 257 m, 22.07.2003
World distribution: Europe, North Africa to Central Asia.

Ballus rufipes (Simon, 1868)
Material examined: 1♂, Antakya District, Alahan village, (36°19'58.3"N 36°11'03.7"E), 238m, 21.07.2002.
World Distribution: Europe, Turkey, Cyprus, North Africa.

Genus ***Carrhotus*** Thorell, 1891
Carrhotus xanthogramma (Latreille, 1819)
Material examined: 1♀, Yayladağ District, Şenköy neighborhood, (36°02'49.1"N 36°08'35.9"E), 717 m, 21.07.2002.
World distribution: Europe, Turkey, Caucasus, Russia, China, Korea, Japan.

Genus ***Chalcoscirtus*** Bertkau, 1880
Chalcoscirtus nigritus (Thorell, 1875)
Material examined: 1♂, Yayladağ District, Şenköy neighborhood, (36°02'49.1"N 36°08'35.9"E), 717 m, 21.07.2003.
World distribution: Europe, Turkey, Caucasus, Russia to Central Asia, China.

Genus ***Cyrba*** Simon, 1876
Cyrba algerina (Lucas, 1846)
Material examined: 1♂, Kırıkhan District, Delibekirli neighborhood, (36°32'10.8"N 36°18'43.1"E), 717 m, 21.07.2003.
World distribution: Canary Is. to Central Asia.

Genus ***Dendryphantes*** C.L. Koch, 1837
Dendryphantes rudis (Sundevall, 1833)
Material examined: 1♂, Kırıkhan District, Delibekirli neighborhood, (36°32'10.8"N 36°18'43.1"E), 717 m, 21.07.2002.
World distribution: Europe, Turkey, Caucasus, Russia to Kazakhstan.

Genus ***Euophrys*** C.L. Koch, 1834
Euophrys frontalis (Walckenaer, 1802)
Material examined: 2♀, Dörtyol District, Karakese plateau, (36°49'24.7"N 36°14'56.4"E), 172m, 24.07.2003.

World distribution: Europe, Turkey, Caucasus, Russia to Central Asia, India, China, Korea, Japan.

Euophrys fucata (Simon, 1868)
Material examined: 1♀, İskenderun District, Aşkarbeyli neighborhood, (36°33'48.1"N 36°13'02.6"E), 257 m, 22.07.2003.
World distribution: Turkey.

Genus ***Evarcha*** Simon, 1902
Evarcha arcuata (Clerck, 1757)
Material examined: 1♀, Dörtyol District, Karakese plateau, (36°49'24.7"N 36°14'56.4"E), 172m, 24.07.2002.
World distribution: Europe, Turkey, Caucasus, Russia to Central Asia, China, Japan.

Evarcha jucunda (Lucas, 1846)
Material examined: 1♀, Dörtyol District, Karakese plateau, (36°49'24.7"N 36°14'56.4"E), 172m, 24.07.2002.
World distribution: Canary Is. to Turkey.

Genus ***Habrocestum*** Simon, 1876
Habrocestum latifasciatum (Simon, 1868)
Material examined: 1♀, Dörtyol District, Karakese plateau, (36°49'24.7"N 36°14'56.4"E), 172m, 24.07.2003.
World distribution: Eastern Mediterranean to Near East.

Genus ***Heliophanus*** C.L. Koch, 1833
Heliophanus auratus C.L. Koch, 1835
Material examined: 1♀, Dörtyol District, Karakese plateau, (36°49'24.7"N 36°14'56.4"E), 172m, 24.07.2003.
World distribution: Europe, Turkey, Caucasus, Russia to Central Asia, China.

Heliophanus edentulus Simon, 1871
Material examined: 1♂ 1♀, İskenderun District, Aşkarbeyli neighborhood, (36°33'48.1"N 36°13'02.6"E), 257 m, 22.07.2002.
World distribution: Nigeria, Mediterranean to Iran.

Heliophanus equester L. Koch, 1867
Material examined: 1♂, Kırıkhan District, Delibekirli neighborhood, (36°32'10.8"N 36°18'43.1"E), 717 m, 21.07.2002.
World distribution**:** Italy to Azerbaijan, Iran.

Heliophanus flavipes (Hahn, 1832)
Material examined: 1♂, Yayladağ District, Şenköy neighborhood, (36°02'49.1"N 36°08'35.9"E), 717 m, 21.07.2002.
World distribution: Europe, Turkey, Caucasus, Russia to Central Asia, China.

Genus ***Icius*** Simon, 1876
Icius hamatus (C.L. Koch, 1846)
Material examined: 1♀, İskenderun District, Hüyük neighborhood, (36°33'48.1"N 36°13'02.6"E), 20 m, 21.07.2003.
World distribution: Atlantic Is., North Africa, Southern Europe, Turkey, introduced to Central Europe.

Genus ***Marpissa*** C.L. Koch, 1846
Marpissa muscosa (Clerck, 1757)
Material examined: 1♀, Antakya District, Alahan village, (36°19'58.3"N 36°11'03.7"E), 238m, 21.07.2002.
World distribution: Europe, Turkey, Caucasus, Russia (Europe to Central Asia), Japan.

Marpissa radiata (Grube, 1859)
Material examined: 1♂, İskenderun District, Hüyük neighborhood, (36°33'48.1"N 36°13'02.6"E), 20 m, 21.07.2003.
World distribution: Europe, Turkey, Caucasus, Russia to Kazakhstan.

Genus ***Pellenes*** Simon, 1876
Pellenes geniculatus (Simon, 1868)
Material examined: 1♂, İskenderun District, Hüyük neighborhood, (36°33'48.1"N 36°13'02.6"E), 20 m, 21.07.2002.
World distribution: Southern Europe, Africa, Turkey, Caucasus, Near East, Iran.

Genus ***Philaeus*** Thorell, 1869
Philaeus chrysops (Poda, 1761)
Material examined: 1♂, İskenderun District, Aşkarbeyli neighborhood, (36°33'48.1"N 36°13'02.6"E), 257 m, 22.07.2003.
World distribution: Europe, North Africa to Near East, Turkey, Caucasus, Russia to Central Asia, Iran, Afghanistan, China, Mongolia, Korea.

Genus ***Phlegra*** Simon, 1876
Phlegra fasciata (Hahn, 1826)
Material examined: 1♂, Hassa District, Ardıçlı neighborhood, (36°43'46.0"N 36°28'42.8"E), 320 m, 21.07.2002.
World distribution: Europe, Turkey, Caucasus, Russia to Central Asia, Iran, Afghanistan, India, China, Mongolia, Korea, Japan.

Phlegra lineata (C.L. Koch, 1846)
Material examined: 1♀, Hassa District, Ardıçlı neighborhood, (36°43'46.0"N 36°28'42.8"E), 320 m, 21.07.2002.
World distribution: Southern Europe, Turkey, Syria.

Genus ***Plexippus*** C.L. Koch, 1846
Plexippus paykulli (Audouin, 1825)
Material examined: 1♂, İskenderun District, Hüyük neighborhood, (36°33'48.1"N 36°13'02.6"E), 20 m, 21.07.2003.
World distribution: Africa. Introduced to both Americas, Europe, India, China, Japan, Korea, Philippines, Papua New Guinea, Australia, Pacific islands.

Genus ***Synageles*** Simon, 1876
Synageles dalmaticus (Keyserling, 1863)
Material examined: 1♀, İskenderun District, Tatarlı neighborhood, (36°20'08.6"N 35°49'19.3"E), 80m, 24.07.2003.
World distribution: Mediterranean.

Synageles venator (Lucas, 1836)
Material examined: 1♀, Dörtyol District, Karakese plateau, (36°49'24.7"N 36°14'56.4"E), 172m, 24.07.2002.
World distribution: Europe, Turkey, Central Asia to East Russia, China, Japan, Canada.

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A study on the spider fauna of Afyonkarahisar Province in Turkey

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Abstract

This study was done in Afyonkarahisar province, inner part of Western Anatolia. Spiders were collected from field by using aspirator, sweep net and pitfall traps in study area in two years, beginning from April 2015 to October 2016. As a result of identification of these specimens, a total of 118 spider species belonging to 84 genera in 25 families were recorded. All specimens were labelled and preserved as museum material in Arachnology Museum of Niğde Ömer Halisdemir University.

Keywords: Spiders, Araneae, Fauna, Afyonkarahisar, Turkey.

Introduction

The spider fauna of Turkey is poorly known compared to other countries of the world. Up to now, 47309 species of 4076 genera of spiders have been described in the world (World Spider Catalog, 2018). There are only 1117 species, belonging to 52 families known from Turkey (Demir & Seyyar, 2017). The aim of this study is to present the spider diversity of Afyonkarahisar province.

Material and Methods

All specimens were collected from field by using aspirator, sweep net and pitfall traps from 36 localities in Afyonkarahisar province in two years, beginning from April 2015 to October 2016. The identification was made by means of a SZX61 Olympus stereomicroscope. Museum material was used in comparison for species identification. The collected specimens were labelled and preserved as museum material in Arachnology Museum of Niğde Ömer Halisdemir University (NOHUAM).

Fig. 1. Location of Afyonkarahisar Province in Turkey.

	LOCALITIES		
1	Afyonkarahisar, Sultandağı, Değirmenköy	19	Afyonkarahisar, Emirdağ, Ağılcık
2	Afyonkarahisar, Sultandağı, Akbaba köyü	20	Afyonkarahisar, Emirdağ, Emirinköyü
3	Afyonkarahisar, Sultandağı, Camözü köyü	21	Afyonkarahisar, Bayat
4	Afyonkarahisar, Sultandağı, Dereçine köyü	22	Afyonkarahisar, İşcehisar, Doğanlar
5	Afyonkarahisar, Sultandağı, Dereçine köyü	23	Afyonkarahisar, Salar
6	Afyonkarahisar, Sultandağı 1	24	Afyonkarahisar, Belkaraören
7	Afyonkarahisar, Sultandağı 2	25	Afyonkarahisar, Şuhut
8	Afyonkarahisar, Sultandağı 3	26	Afyonkarahisar, Şuhut, Tekke
9	Afyonkarahisar, Sultandağı, Yakasinek	27	Afyonkarahisar, Şuhut, Başören
10	Afyonkarahisar, Sultandağı, Deresinek	28	Afyonkarahisar, Şuhut- Sandıklı Arası
11	Afyonkarahisar, Sultandağı, Deresinek vadi içi	29	Afyonkarahisar, Sandıklı
12	Afyonkarahisar, Çay	30	Afyonkarahisar, Sandıklı, Kızılören
13	Afyonkarahisar, Çay, Eber gölü çevresi	31	Afyonkarahisar, Dinar, Akça
14	Afyonkarahisar, Bolvadin	32	Afyonkarahisar, Dinar, Büyüçalanı
15	Afyonkarahisar, Bolvadin, Özburun	33	Afyonkarahisar, Dinar, Başmakçı, Çığrı
16	Afyonkarahisar, Bolvadin, Özburun	34	Afyonkarahisar, Dazkırı, Bozan
17	Afyonkarahisar, Bolvadin, Kemerkaya	35	Afyonkarahisar, Sinanpaşa
18	Afyonkarahisar, Emirdağ, Başkonak	36	Afyonkarahisar, Hocalar, Akçadere

Table 1. Collecting localities in Afyonkarahisar Province.

Results

A total of 118 spider species belonging to 84 genera in 25 families were determined from the study area. Most species rich families were Gnaphosidae, Salticidae, Thomisidae, and Theridiidae. According to the result of this study, the spider diversity in

Afyonkarahisar Province contains nearly 47% at the family level, 27% at the genus level and 11% at the species level of all recorded spider species from Turkey.

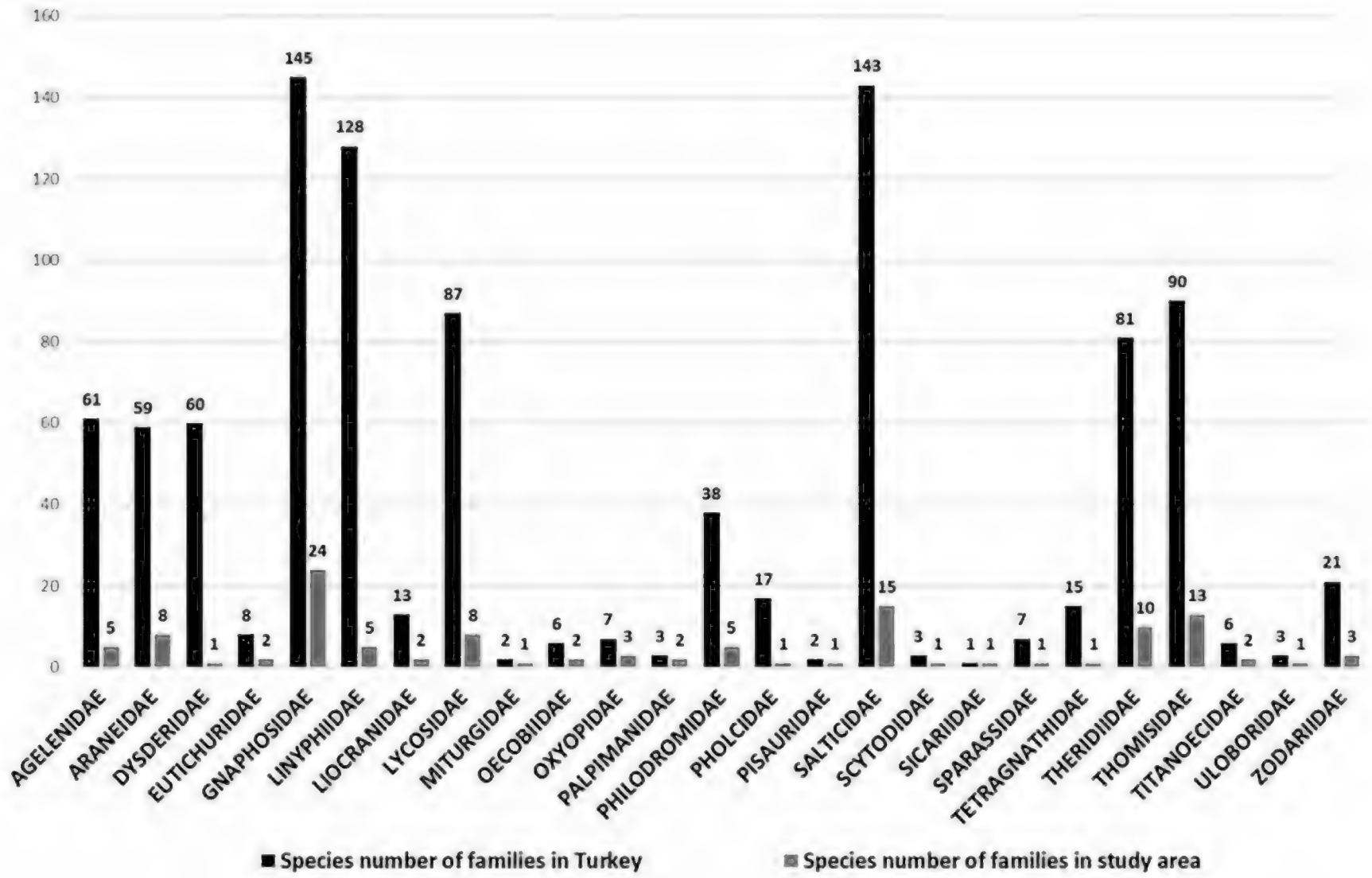

Fig. 2. Comparison of species numbers of 25 spider families in Turkey and study area.

Table 2. The spider list of Afyonkarahisar Province.

Family	Agelenidae
1	*Agelena labyrinthica* (Clerck, 1757)
2	*Agelena orientalis* C.L. Koch, 1837
3	*Agelescape gideoni* Levy, 1996
4	*Maimuna vestita* (C.L. Koch, 1841)
5	*Tegeneria argaeica* (Nosek, 1905)
Family	Araneidae
1	*Aculepeira armida* (Savigny, 1825)
2	*Aculepeira ceropegia* (Walckenaer, 1802)
3	*Araniella cucurbitina* (Clerck, 1757)
4	*Argiope lobata* (Pallas, 1772)
5	*Gibbaranea bituberculata* (Walckenaer, 1802)
6	*Larinioides cornutus* (Clerck, 1757)
7	*Mangora acalypha* (Walckenaer, 1802)
8	*Neoscona adianta* (Walckenaer, 1802)
Family	Dysderidae
1	*Dysdera crocata* C.L. Koch, 1838
Family	Eutichuridae
1	*Cheiracanthium erraticum* (Walckenaer, 1802)
2	*Cheiracanthium pennyi* O. Pickard-Cambridge, 1873

Family	Gnaphosidae
1	*Anagraphis pallens* Simon, 1893
2	*Callilepis nocturna* (Linnaeus, 1758)
3	*Cesonia aspida* Chatzaki, 2002
4	*Civizelotes caucasius* (L. Koch, 1866)
5	*Drassodes lacertosus* (O. Pickard-Cambridge, 1872)
6	*Drassodes lapidosus* (Walckenaer, 1802)
7	*Gnaphosa dolosa* Herman, 1879
8	*Gnaphosa opaca* Herman, 1879
9	*Haplodrassus invalidus* (O. Pickard-Cambridge, 1872)
10	*Haplodrassus morosus* (O. Pickard-Cambridge, 1872)
11	*Haplodrassus signifer* (C.L. Koch, 1839)
12	*Micaria coarctata* (Lucas, 1846)
13	*Nomisia aussereri* (L. Koch, 1872)
14	*Nomisia conigera* (Spassky, 1941)
15	*Nomisia exornata* (C.L. Koch, 1839)
16	*Nomisia pariensis* (O. Pickard-Cambridge, 1872)
17	*Phaeocedus braccatus* (L. Koch, 1866)
18	*Pterotricha kochi* (O. Pickard-Cambridge, 1872)
19	*Setaphis parvula* (Lucas, 1846)
20	*Trachyzelotes malkini* (Platnick & Murphy, 1984)
21	*Zelotes cingarus* (O. Pickard-Cambridge, 1874)
22	*Zelotes longipes* (L. Koch, 1866)
23	*Zelotes metellus* Roewer, 1928
24	*Zelotes subterraneus* (C.L. Koch, 1833)
Family	Linyphiidae
1	*Frontinellina frutetorum* (C.L. Koch, 1834)
2	*Lepthyphantes leprosus* (Ohlert, 1865)
3	*Linyphia triangularis* (Clerck, 1757)
4	*Megalepthyphantes nebulosus* (Sundevall, 1830)
5	*Neriene peltata* (Wider, 1834)
Family	Liocranidae
1	*Arabelia pheidoleicomes* Bosselaers, 2009
2	*Mesiotelus scopensis* Drensky, 1935
Family	Lycosidae
1	*Alopecosa farinosa* (Herman, 1879)
2	*Alopecosa pulverulenta* (Clerck, 1757)
3	*Arctosa cinerea* (Fabricius, 1777)
4	*Hogna radiata* (Latreille, 1817)
5	*Pardosa agrestis* (Westring, 1861)
6	*Pardosa monticola* (Clerck, 1757)
7	*Pardosa proxima* (C.L. Koch, 1847)
8	*Wadicosa fidelis* (O. Pickard-Cambridge, 1872)
Family	Miturgidae
1	*Zora spinimana* (Sundevall, 1833)

Family	Oecobiidae
1	*Oecobius rhodiensis* Kritscher 1966
2	*Uroctea durandi* (Latreille, 1809)
Family	Oxyopidae
1	*Oxyopes heterophthalmus* (Latreille, 1804)
2	*Oxyopes lineatus* Latreille, 1806
3	*Oxyopes ramosus* (Martini & Goeze, 1778)
Family	Palpimanidae
1	*Palpimanus gibbulus* Dufour, 1820
2	*Palpimanus uncatus* Kulczyński, 1909
Family	Philodromidae
1	*Philodromus cespitum* (Walckenaer, 1802)
2	*Pulchellodromus pulchellus* (Lucas, 1846)
3	*Thanatus atratus* Simon, 1875
4	*Thanatus formicinus* (Clerck, 1757)
5	*Thanatus oblongiusculus* (Lucas, 1846)
Family	Pholcidae
1	*Pholcus phalangioides* (Fuesslin, 1775)
Family	Pisauridae
1	*Pisaura mirabilis* (Clerck, 1757)
Family	Salticidae
1	*Aelurillus luctuosus* (Lucas, 1846)
2	*Ballus chalybeius* (Walckenaer, 1802)
3	*Chalcoscirtus nigritus* (Thorell, 1875)
4	*Cyrba algerina* (Lucas, 1846)
5	*Evarcha falcata* (Clerck, 1757)
6	*Heliophanus cupresus* (Walckenaer, 1802)
7	*Heliophanus edentulus* Simon, 1871
8	*Leptorchestes sikorskii* Prószyński, 2000
9	*Pellenes geniculatus* (Simon, 1868)
10	*Philaeus chrysops* (Poda, 1761)
11	*Phlegra bresnieri* (Lucas, 1846)
12	*Phlegra fasciata* (Hahn, 1826)
13	*Plexippus paykulli* (Audouin, 1825)
14	*Salticus scenicus* (Clerck, 1757)
15	*Talavera aequipes* (O. Pickard-Cambridge, 1871)
Family	Scytodidae
1	*Scytodes thoracica* (Latreille, 1802)
Family	Sicariidae
1	*Loxosceles rufescens* (Dufour, 1820)
Family	Sparassidae
1	*Eusparassus walckenaeri* (Audouin, 1825)
Family	Tetragnathidae
1	*Tetragnatha obtusa* C.L. Koch, 1837

Family	Theridiidae
1	*Asagena phalerata* (Panzer, 1801)
2	*Cryptachaea riparia* (Blackwall, 1834)
3	*Enoplognatha mandibularis* (Lucas, 1846)
4	*Enoplognatha oelandica* (Thorell, 1875)
5	*Enoplognatha thoracica* (Hahn, 1833)
6	*Episinus truncatus* Latreille, 1809
7	*Euryopis laeta* (Westring 1861) ?
8	*Neottiura herbigrada* (Simon, 1873)
9	*Steatoda albomaculata* (De Geer, 1778)
10	*Steatoda paykulliana* (Walckenaer, 1806)
Family	Thomisidae
1	*Heriaeus graminicola* (Doleschall, 1852)
2	*Ozyptila atomaria* (Panzer, 1801)
3	*Synema globosum* (Fabricius, 1775)
4	*Thomisus onustus* Walckenaer, 1805
5	*Tmarus stellio* Simon, 1875
6	*Xysticus caperatus* Simon, 1875
7	*Xysticus edax* (O. Pickard-Cambridge, 1872)
8	*Xysticus kaznakovi* Utochkin, 1968
9	*Xysticus kochi* Thorell, 1872
10	*Xysticus laetus* Thorell, 1875
11	*Xysticus pseudorectilineus* (Wunderlich, 1995)
12	*Xysticus thessalicus* Simon, 1916
13	*Xysticus tristrami* (O. Pickard-Cambridge, 1872)
Family	Titanoecidae
1	*Nurscia albomaculata* (Lucas 1846)
2	*Titanoeca quadriguttata* (Hahn, 1833)
Family	Uloboridae
1	*Uloborus walckenaerius* Latreille, 1806
Family	Zodariidae
1	*Pax islamita* (Simon, 1873)
2	*Zodorion kossamos* Bosmans, 2009
3	*Zodarion thoni* Nosek, 1905

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A contribution to the knowledge of the spider fauna of Iran (Araneae: Oecobiidae)

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Abstract

Two wall spider species, *Oecobius cellariorum* (Dugès, 1836) and *Oecobius putus* O. Pickard-Cambridge, 1876 are briefly described and illustrated from Dezful, Khuzestan province, a new locality of both species in Iran.

Keywords: Araneae, Oecobiidae, Dezful, Khuzestan, Iran.

Introduction

Oecobiidae Blackwall, 1862 is a relatively small spider family, with 113 described species worldwide distributed (World Spider Catalog, 2018). This family is characterized by the remarkable anal tubercle which is large, movable and two-jointed. The members of this small family have three tarsal claws, both the carapace and sternum are wider than long (Saaristo, 2010). The oecobiids are generally cosmopolitan, occurring abundantly in urban areas of several continents. The spiders live under stones, but are often found in houses, especially in corner angles of walls (Tikader & Biswas, 1981; Santos & Gonzaga, 2003; Voss *et al.*, 2007).

The oecobiid spiders of Asia are not well known (Shear & Benoit, 1974). Among the known 87 species and 2 subspecies of genus *Oecobius* Lucas, 1846 (World Spider Catalog, 2018), just five species are recorded from Iran (Zamani *et al.*, 2018): *Oecobius cellariorum* (Dugès, 1836), *O. nadiae* (Spassky, 1936), *O. putus* O. Pickard-Cambridge, 1876, and the two recently described endemic species: *O. ferdowsii* Mirshamsi, Zamani & Marusik, 2017 and *O. ilamensis* Zamani, Mirshamsi & Marusik, 2017. In this study, we add new locality record, Khuzestan province: Dezful (Fig. 1), of *O. cellariorum* and

O. putus for Iran. Both studied species have been previously reported from Iran (Zamani *et al.*, 2018) but our samples has some variations from other Iranian specimens.

Material and Methods

All specimens were collected in spring and summer 2014 by hand collecting method and preserved in 70% ethanol. Samples were examined under an hp stereo microscope. Pedipalps of males were checked and identified according to Wunderlich (1995) and Nentwig *et al.* (2018). Examined specimens deposited in the collection of the first author.

Fig. 1. Map of Iran and location where specimens were collected in Dezful city.

Results

Oecobius cellariorum (Dugès, 1836) (Fig. 2)
Material and Locality: 1♂, Iran: Khuzestan province: Dezful.
Description: The cephalothorax is brown in colour, oval in shape. It is as wide as long. There are faint black markings radiating from it towards the lateral edges of the cephalothorax which is flattened but raised into a hump at the ocular area. Abdomen is oval, yellow brownish with dark hairs. No regular marking on the abdomen. There are two large brown spots on the central of the posterior half of the abdomen. The cribellum is present in front of the spinnerets. It is pale yellowish in colour fringed with short black hairs. Legs are pale yellow. Femur, tibia and metatarsus have dark markings. The palpal organ is prominent and brown in colour. The median apophysis is rather thick and short. It extends outside into an inverted beak. Its base is swollen and its tip is curved towards the tarsus apex. The bulb is folded twice inside the cymbium. The embolus is a small process projecting to the outside from the centre of the palpal organ.
Distribution: Southern Europe to northern Africa, Jordan and Iran. Introduced to USA, China, Japan (World Spider Catalog, 2018). Iranian record: Mazandaran (Zamani *et al.*, 2018).
Habitat in Iran: The specimen was found on a house's wall.

Fig. 2. *Oecobius cellariorum* (Dugès, 1836) ♂. a-b. Habitus. a. dorsal view. b. ventral view. c-d. Palpal organ. c. retrolateral view. d. prolateral view.

Fig. 3. *Oecobius putus* O. Pickard-Cambridge, 1876 ♂. a-b. Habitus. a. dorsal view. b. ventral view. c-d. Palpal organ. c. retrolateral view. d. prolateral view.

Oecobius putus O. Pickard-Cambridge, 1876 (Fig. 3)
Material and Locality: 2♂, 2 juveniles, Iran: Khuzestan province: Dezful.
Description: The cephalothorax is pale yellow in colour with a brown line formed of irregular brown spots at the lateral margin. The lateral faint striations are present, and all are of the same colour, so no Y-shaped marking is represented here in this species. The ocular area is black in colour. The sternum is heart-shaped, yellowish in colour, bordered with brown; furnished with scattered black long hairs. Its edges are entire without concavities. The labium is wider than long, blackish in colour with a slightly rounded tip. The maxillae are of the same colour as the sternum, with black hairs on them. The abdomen is pale yellow in colour, oval in shape, furnished with black hairs. The cruciform brown marking on the dorsal surface is not clear, wide and are not branched. The spinnerets are pale yellow in colour, thickly covered with black and white hairs. The pedipalps are similar in colour to the legs. They are thickly furnished with fine black hairs.
Distribution: Egypt, Sudan to Iran, Azerbaijan, India. Introduced to USA, Mexico (World Spider Catalog, 2018). Iranian records: Fars, Hormozgan, Tehran (Zamani *et al.*, 2018).
Habitat in Iran: The specimens were found under stones.

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A new species record of *Pholcus* Walckenaer, 1805 in Turkey (Araneae: Pholcidae)

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Abstract

Pholcus ponticus Thorell, 1875 is recorded for the first time from Turkey. The characteristic features of both male and female genitalia are given in this study.

Keywords: Araneae, Pholcidae, *Pholcus ponticus*, new record, Turkey.

Introduction

By having 389 valid species, *Pholcus* Walckenaer, 1805 is the most diverse and species-rich genus of the family Pholcidae C.L. Koch, 1850. Apart from the fact that some of them are synanthropic species, they have a wide distribution in the old world (World Spider Catalog, 2018). The first revision of the genus is carried out by Huber (2011) who defined 29 species groups. The members of the *ponticus* species group are represented by 5 species and can be distinguished from the other species groups in *Pholcus* by the combination of the following characters: eight eyes, male chelicerae with proximal and distal apophyses, abdomen long oval to cylindrical, without cuticular pattern, procursus with dorsal spines, appendix simple and without branch, distally characteristically twisted sclerotized epigynum with knob (Huber, 2011).

There are 5 *Pholcus* species from 2 different species-groups known from Turkey. They are: *Pholcus crassipalpis* Spassky, 1937 and *Pholcus opilionoides* (Schrank, 1781) (*opilionoides* group); *Pholcus phalangioides* (Fuesslin, 1775), *Pholcus spasskyi* Brignoli, 1978 and *Pholcus turcicus* Wunderlich, 1980 (*phalangioides* group). *Pholcus spasskyi* and *Pholcus turcicus* are only known from Turkey (Bayram *et al.*, 2017; World Spider Catalog, 2018).

In this study, *Pholcus ponticus* Thorell, 1875 is recorded for the first time from Turkey. It is the first record of *ponticus* species-group from Turkey too.

Material and Methods

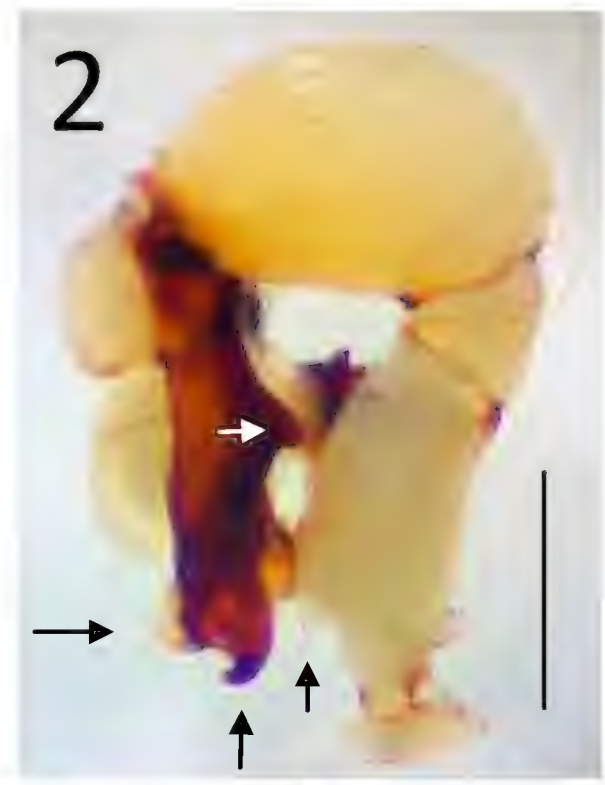
The specimens were collected in 2012-2014 from Muş Province, East Anatolian Region of Turkey by the means of hand aspirator from the buildings in daytime. Samples were preserved in 70% ethanol and were kept at the personal collection of the first author. The identification was made using the descriptions of Huber (2011) and Fedoriak & Moscaliuc (2013). All measurements are in millimetres.

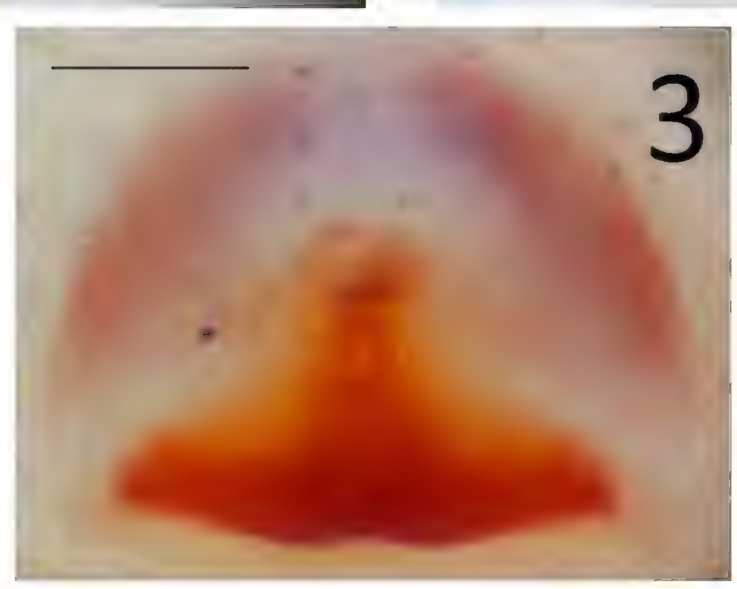
Results

Family **Pholcidae** C.L. Koch, 1850
Genus ***Pholcus*** Walckenaer, 1805

Pholcus ponticus Thorell, 1875

Material Examined: 2♀♀, Muş Province, Hasköy District, Ortanca Village 17.10.2012; 2♀♀, Muş Province, Hasköy District, Karakütük Village 03.09.2013; 2♀♀, Muş Province, Korkut District, Yedipınar Village 12.09.2013; 1♂, Muş Province, Hasköy District, Elmabulak Village 03.09.2013; 2♂♂, Muş Province, Korkut District, Yedipınar Village 11.10.2014 Leg. Gökhan Gündüz.
Distribution: Romania, Bulgaria to China (World Spider Catalog, 2018).





Figs. 1-3. *Pholcus ponticus* Thorell, 1875 1-2. Male left palpus. 1. prolateral view. 2. retrolateral view. 3. Female epigynum, ventral view. Scale bar: 0.5.

Description

Male: Total length 4.3, Prosoma length 1.3, width 1.4. Abdomen length 3, width 1. Prosoma pale yellow. Carapace with median mark divided by a thin yellow line, long hairs behind ocular area. Chelicerae darker than prosoma. Sternum light brown with whitish pale spots on margin near coxae and labium. Femora slightly darkened proximally. Abdomen cylindrical, light yellow. Palpal trochanter with retro-ventral apophysis. Palpal femur with a roughly rectangular retro-ventral process. Procursus with a curved ventral apophysis, membranous dorsal projection and with several dorsal spines. Bulb with uncus. Embolus short, distally transparent (Figs. 1-2).

Female: Colouration generally as in males except femoral darkness. Epigynum slightly protrude. Triangular plate well sclerotized. Internal arc structure somewhat visible through triangular plate (Fig. 3).

Diagnosis. This species can be distinguished from the other species in the *ponticus* group by the morphology of male palp. Dorsal and ventral projections on procursus are characteristic. Additionally, male palpal femur have a rough rectangular shaped bulge (Arrows in Fig. 2).

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A checklist of spiders from six sacred groves in Southern Odisha, India

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Abstract

A checklist of spiders was prepared from six sacred groves of Koraput district, Eastern Ghats of Southern Odisha, India during a survey conducted during September 2014 to August 2015. A total of 81 species of spiders under 51 genera from 19 families were recorded and this is the maximum recorded species of spiders from sacred groves in India. Highest numbers of spiders were reported under family Araneidae (26 species) and Salticidae (17 species). Kanta Bausuni sacred grove recorded the maximum, 67 species, of spiders with 25 exclusive species. It is suggested that more systematic studies need to be undertaken in future on spider diversity as well as endemic faunal diversity in sacred groves, which will be helpful for undertaking conservation measures.

Keywords: Spiders, Sacred grove, Koraput, southern Odisha.

Introduction

Sacred groves are small patches of native vegetation conserved through man's spiritual belief and faith. They include natural areas recognized as sacred by indigenous and traditional peoples as well as natural areas recognized by institutionalized religions or faiths as places for worship and remembrance (Oviedo *et al.*, 2005). In such groves, highest levels of biological diversity are found (Hughes & Chandran, 1998). Besides centre of high species richness (Jamir & Pandey, 2003; Upadhaya *et al.*, 2003; Dash, 2005), they act as a gene pool and provide refuge to a large number of endemic, endangered and threatened species (Jamir & Pandey, 2003). In India more than 100000 sacred groves are present (Malhotra *et al.*, 2000, 2001, 2007) which are resorts of several flora and fauna, many of which are endemic. However, documentation of biological diversity have been carried out in the past in few of the sacred-groves in states like Maharashtra (Gadgil & Vartak, 1981; Rao, 2005; Nipunage *et al.*, 2009, Nipunage & Kulkarni, 2011; Phansalkar & Kulkarni, 2014), Madhya Pradesh (Kala, 2011), and in Kerala (Pattazhy, 2011).

Among arthropods, spiders are abundant in both natural and man-made environments (Greenstone, 1999; Marc *et al.*, 1999) and are sensitive indicators of environmental change (Jocqué *et al.*, 2005; Kapoor 2008). Spiders are being used as indicators because of the advantages that they are present at high densities from the ground level to the top canopies, community variations can be detected even for a small area within a given biotope. Further, they hold a strategic level within the food chain as predators or prey, and spider assemblages quickly and strongly respond to brief or sudden changes in environmental conditions (Marc *et al.*, 1999). Studies on spider diversity are very few, although they are among the most abundant insectivorous predators of terrestrial ecosystems (Nyffeler & Benz, 1987; Wise, 1993). Spider diversity was studied in sacred groves of Kerala (Sivaperuman, 1999, 2008, 2011; Sivaperuman *et al.*, 2002), Konkan and the northern Western Ghats (Patil, 2011), Anjanavale sacred grove of Pune district (Phansalkar & Kulkarni, 2014) and sacred groves of Ratnagiri, Maharashtra (Patil, 2016).

Koraput is a tribal dominated district in the Eastern Ghats of southern Odisha, India and has significant number of sacred groves. There are about 322 sacred groves reported from Semiliguda block of Koraput district (Malhotra *et al.*, 2007). However, till date, no study has been carried out to explore faunal diversity of sacred groves in Koraput district. Therefore, a checklist of spiders has been prepared from a survey conducted in six sacred groves in the Koraput district of Odisha to know the alpha diversity of spiders and their distribution among study sites.

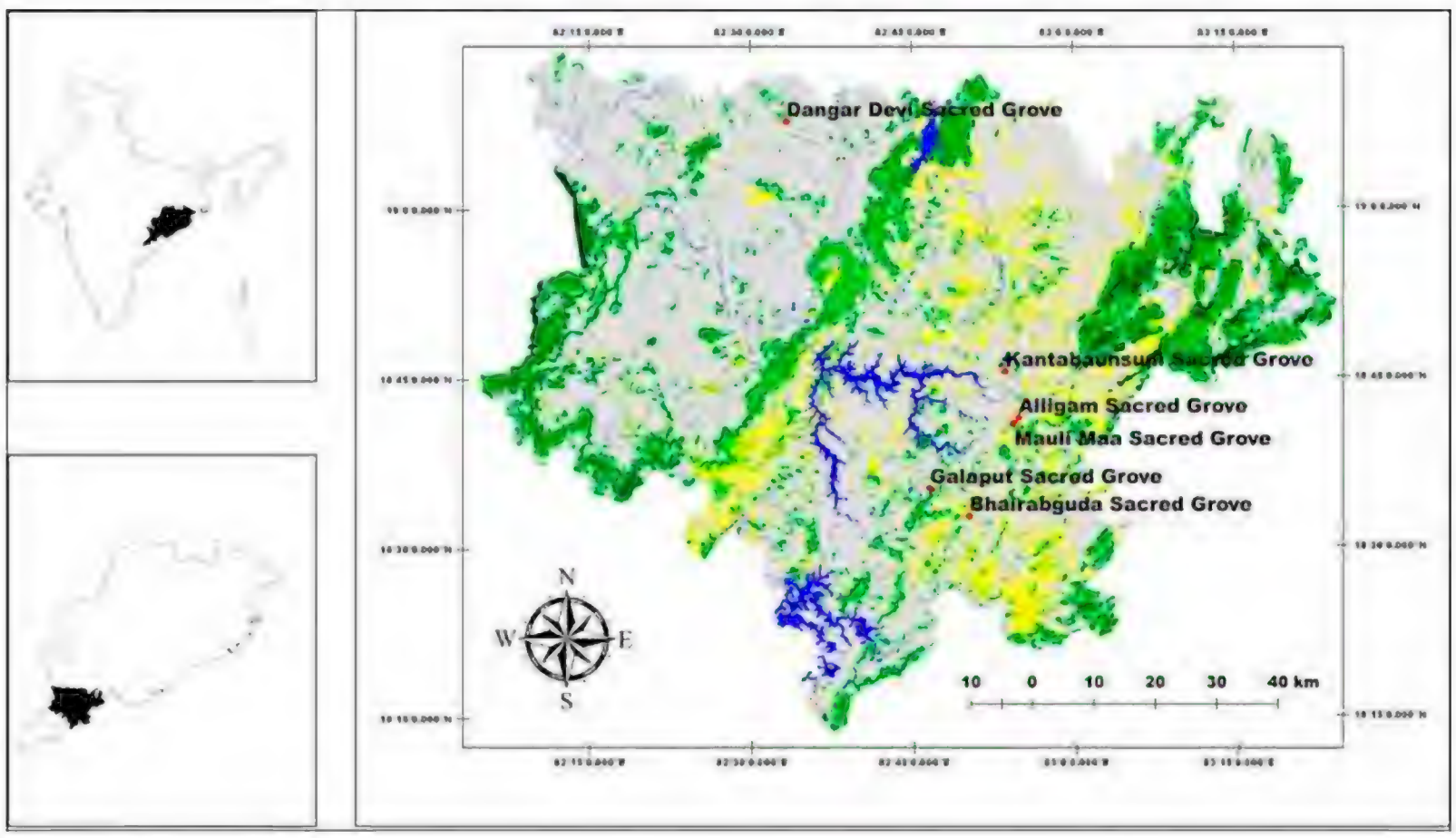

Fig. 1. Location of six sacred groves in Koraput district, southern Odisha, India.

Material and Methods

The study was carried out in the six selected sacred groves of Koraput district of the state of Odisha during September 2014 to August 2015. Koraput is one of the hilly regions of Eastern Ghats of southern Odisha, India (Fig. 1). It lies between 18°14′ to 19°14′ N and 82°05′ to 83°25′ E covering an area of 8807 sq km. Forest cover of Koraput is broadly characterised by tropical moist deciduous type and tropical dry deciduous type (Champion & Seth, 1968). The topography of the area is undulating with discontinuous mountains interspersed with rivers, water reservoirs and a number of waterfalls. The six

sacred groves in which spiders were studied are Alligam Sacred Grove (AG), Bhairabguda Sacred Grove (BG), Dangar Devi Sacred Grove (DD), Galaput Sacred Grove (GP), Kanta Baunsuni Sacred Grove (KB), and Mauli Maa Sacred Grove (MM). Locations of these sacred groves are given in Table (1). The natural vegetation in all the six sacred groves have been kept intact because of religious belief.

Table 1. Location and area of six sacred groves of Koraput, southern Odisha, India.

Name of sacred grove	GPS coordinates	Altitude
Alligam (AG)	18°41'30.99"N, 82°54'47.92"E	947m
Bhairab Guda (BG)	18°32'49.80"N, 82°50'09.94"E	916m
Dangar Devi (DD)	19°07'50.16"N, 82°33'20.99"E	594m
Galaput (GP)	18°35'18.03"N, 82°46'32.40"E	920m
Kanta Baunsuni (KB)	18°45'37.58"N, 82°53'34.26"E	900m
Mauli Maa (MM)	18°41'01.55"N, 82°54'22.81"E	940m

Plate 1. Photographs of some spiders of sacred groves of Koraput, Odisha.
A. *Araneus mitificus*. B. *Argiope aemula*. C. *Cyclosa bifida*. D. *Cyrtophora cicatrosa*. E. *Cyrtophora unicolor*. F. *Gasteracantha kuhli*. G. *Neoscona mukerjei*. H. *Neoscona theisi*. I. *Thelacantha brevispina*. J. *Stegodyphus sarasinorum*. K. *Hersilia savignyi*. L. *Nephila pilipes*. M. *Dendrolycosa robusta*. N. *Harmochirus brachiatus*. O. *Hasarius adansoni*. P. *Menemerus bivittatus*. Q. *Myrmaplata plataleoides*. R. *Phintella vittata*. S. *Plexippus paykulli*. T. *Rhene flavicomans*. U. *Telamonia dimidiata*. V. *Guizygiella melanocrania*. W. *Leucauge decorata*. X. *Opadometa fastigata*. Y. *Zosis geniculata*.

Spiders were collected by litter extraction, pitfall traps, sweep netting, vegetation beating and handpicking methods. For the vegetation above 2m, folding aluminium platform step-ladder of 1.5m height was used. Collected spiders were preserved in 70% ethyl alcohol in plastic vials for further identification. Spiders were identified by using keys of Pocock (1900), Tikader & Malhotra (1980), Tikader (1982, 1987), Majumder (2007), Gajbe (2008), and Sebastian & Peter (2009). Selected photographs of some spiders have been presented in Plate (1).

Results and Discussion

Alpha diversity

A total of 81 species of spiders from 51 genera under 19 families were reported from the six selected sacred groves (Table 2). Maximum of 26 species are represented under family Araneidae, followed by 17 species under Salticidae, 7 species under Oxyopidae, 6 species under Tetragnathidae, 5 species under Thomisidae, 4 species under Theridiidae, 3 species under Lycosidae, 2 species under Pisauridae, and one species each under 11 families (Agelenidae, Corinnidae, Ctenidae, Eresidae, Eutichuridae, Hersiliidae, Nephilidae, Pholcidae, Scytodidae, Uloboridae, and Zodariidae) (Fig. 2).

Table 2. Distribution of spiders in six sacred groves of Koraput, southern Odisha.

Family	Genus	Species	Sacred Groves					
			AG	BG	DD	GP	KB	MM
Agelenidae	*Agelena*	*Agelena* sp. 1	+	+	+	+	+	+
Araneidae	*Araneus*	*Araneus mitificus*	+	+	+	+	+	+
		Araneus sp. 1	+	+	-	-	-	+
		Araneus sp. 2	+	-	+	-	+	-
		Araneus sp.3	+	-	-	+	-	-
		Araneus sp.4	-	-	-	+	-	-
	Argiope	*Argiope aemula*	-	-	-	-	+	-
		Argiope minuta	+	+	+	+	+	+
	Cyclosa	*Cyclosa bifida*	-	+	+	-	+	-
		Cyclosa spirifera	-	-	-	+	+	-
		Cyclosa sp. 1	+	+	+	+	+	+
		Cyclosa sp. 2	+	+	+	+	+	+
		Cyclosa sp. 3	-	+	-	-	-	-
	Cyrtophora	*Cyrtophora cicatrosa*	+	+	+	+	+	+
		Cyrtophora feai	-	-	-	-	-	+
		Cyrtophora unicolor	-	-	-	-	+	-
	Eriovixia	*Eriovixia* sp. 1	-	-	-	-	+	-
		Eriovixia sp. 2	-	-	-	-	+	-
	Gasteracantha	*Gasteracantha kuhli*	-	-	-	-	+	-
	Neoscona	*Neoscona bengalensis*	+	-	+	-	+	-
		Neoscona mukerjei	+	+	+	-	+	+
		Neoscona subfusca	-	-	-	-	+	-
		Neoscona theisi	-	-	-	-	+	-
		Neoscona vigilans	+	+	+	+	+	+
		Neoscona sp. 1	-	-	-	+	-	+
	Parawixia	*Parawixia* sp. 1	-	+	-	-	+	-
	Thelacantha	*Thelacantha brevispina*	-	-	+	-	+	-
Corinnidae	*Castianeira*	*Castianeira* sp. 1	+	-	-	-	-	-
Ctenidae	*Ctenus*	*Ctenus* sp. 1	+	+	+	+	+	+
Eresidae	*Stegodyphus*	*Stegodyphus sarasinorum*	+	+	+	+	-	+

Eutichuridae	*Cheiracanthium*	*Cheiracanthium* sp. 1	-	-	-	-	+	-
Hersiliidae	*Hersilia*	*Hersilia savignyi*	+	+	+	+	+	+
Lycosidae	*Hippasa*	*Hippasa* sp. 1	+	+	+	+	+	+
	Lycosa	*Lycosa* sp. 2	+	+	+	+	+	+
	Pardosa	*Pardosa* sp. 3	+	+	+	+	+	+
Nephilidae *	*Nephila*	*Nephila pilipes*	+	+	+	+	+	+
Oxyopidae	*Hamadruas*	*Hamadruas* sp. 1	-	-	-	-	+	-
		Hamadruas sp. 2	-	-	-	-	+	-
	Oxyopes	*Oxyopes birmanicus*	+	+	+	+	+	+
		Oxyopes sp. 1	+	+	+	+	+	+
		Oxyopes sp. 2	-	-	-	-	+	-
	Peucetia	*Peucetia viridana*	-	-	-	-	+	-
		Peucetia sp. 1	-	-	-	-	+	-
Pholcidae	*Pholcus*	*Pholcus* sp. 1	+	+	+	+	+	+
Pisauridae	*Dendrolycosa*	*Dendrolycosa robusta*	-	-	-	+	-	-
	Perenethis	*Perenethis* sp. 1	-	-	-	-	+	-
Salticidae	*Asemonea*	*Asemonea tenuipes*	-	-	+	-	-	-
	Carrhotus	*Carrhotus viduus*	+	+	+	+	+	+
	Epeus	*Epeus indicus*	-	-	-	-	+	-
		Epeus sp. 1	-	-	-	-	+	-
	Harmochirus	*Harmochirus brachiatus*	-	-	+	-	+	-
	Hasarius	*Hasarius adansoni*	+	+	+	+	+	+
	Hyllus	*Hyllus* sp. 1	+	+	+	+	+	+
	Menemerus	*Menemerus bivittatus*	+	+	+	+	+	+
	Myrmaplata	*Myrmaplata plataleoides*	-	+	+	-	+	+
	Myrmarachne	*Myrmarachne* sp.1	-	-	-	-	+	-
		Myrmarachne sp. 2	-	-	-	-	+	-
	Phintella	*Phintella vittata*	+	+	+	+	+	+
		Phintella sp. 1	-	-	+	-	+	-
	Plexippus	*Plexippus paykulli*	+	+	+	+	+	+
	Rhene	*Rhene flavicomans*	-	-	-	-	+	-
	Stenaelurillus	*Stenaelurillus* sp. 1	-	-	-	+	-	-
	Telamonia	*Telamonia dimidiata*	+	+	+	+	+	+
Scytodidae	*Scytodes*	*Scytodes pallida*	-	-	-	-	+	-
Tetragnathidae	*Guizygiella*	*Guizygiella melanocrania*	-	+	+	-	-	+
	Leucauge	*Leucauge decorata*	+	+	+	+	+	+
	Opadometa	*Opadometa fastigata*	-	-	-	-	+	-
	Tetragnatha	*Tetragnatha mandibulata*	+	+	+	+	+	+
		Tetragnatha sp. 1	+	+	+	+	+	+
		Tetragnatha sp. 2	+	+	+	+	+	+
Theridiidae	*Parasteatoda*	*Parasteatoda* sp. 1	+	+	+	+	+	+
		Parasteatoda sp. 2	+	-	-	-	-	+
		Parasteatoda sp. 3	-	+	-	+	+	-
	Thwaitesia	*Thwaitesia* sp. 1	-	-	+	-	+	-
Thomisidae	*Camaricus*	*Camaricus formosus*	-	-	-	-	+	-
	Misumena	*Misumena* sp. 1	-	-	-	-	+	-
	Runcinia	*Runcinia* sp. 1	-	-	-	+	+	-
	Thomisus	*Thomisus* sp. 1	-	+	-	-	-	-
		Thomisus sp. 2	-	-	-	+	+	+
Uloboridae	*Zosis*	*Zosis geniculata*	-	-	-	+	+	-
Zodariidae	*Hermippus*	*Hermippus* sp. 1	-	-	-	-	+	-
Number of species in each sacred grove			36	38	40	39	67	37

AG: Alligam, BG: Bhairab Guda, DD: Dangar Devi, GP: Galaput, KB: Kanta Baunsuni, MM: Mauli Maa;
+ present, - absent. * Nephilidae is re-synonymized with Araneidae since 2017.

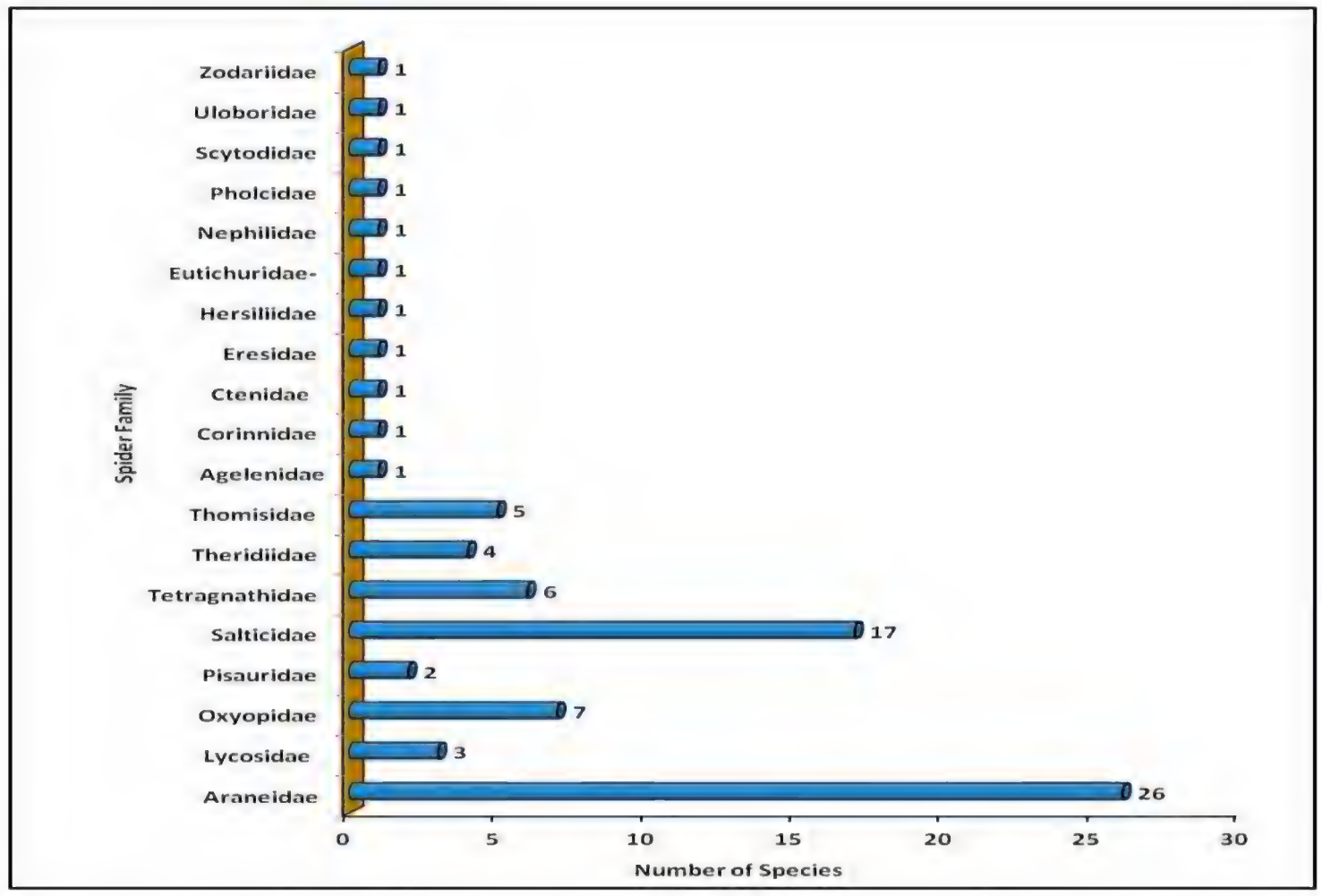

Fig. 2. Species richness under different spider families from six sacred groves in Koraput district, southern Odisha, India.

Among the studied sacred groves, highest species richness of 67 species (from 45 genera under 17 families) was recorded from Kanta Baunsuni (KB), followed by 40 species (from 32 genera under 12 families) from Danger Devi (DD), 39 species (from 30 genera under 15 families) from Galaput (GP), 38 species (from 28 genera under 13 families) from Bhairab Guda (BG), 37 species (from 28 genera under 13 families) from Mauli Maa, and 36 species (from 26 genera under 13 families) from Alligam (Fig. 3).

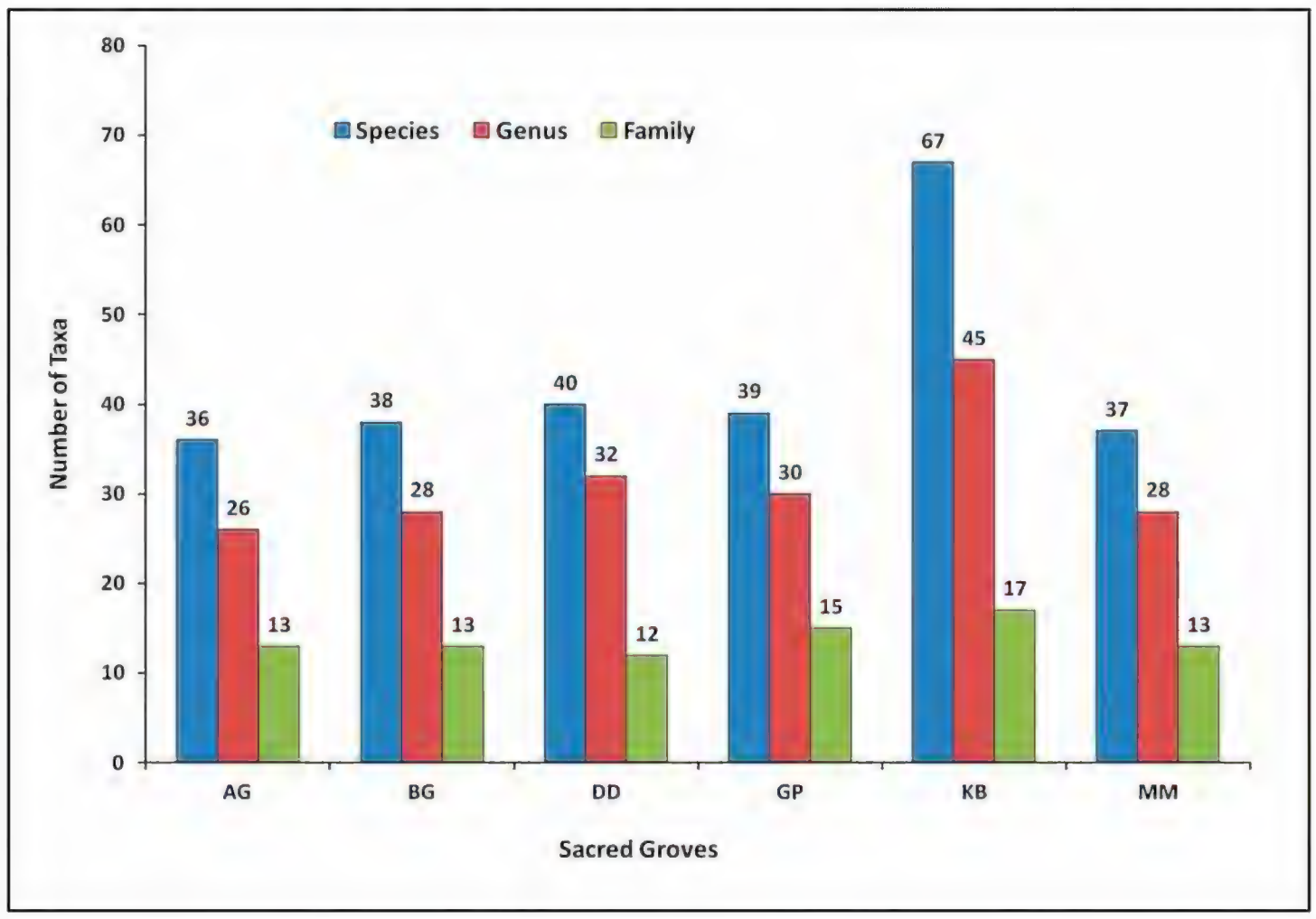

Fig. 3. Representation of Species, Genus and Family of spiders in six sacred groves in Koraput district, southern Odisha, India.
(AG: Alligam, BG: Bhairab Guda, DD: Danger Devi, GP: Galaput, KB: Kanta Bausuni, MM: Mauli Maa)

From a total of 67 species of spiders from Kanta Baunsuni, a maximum of 20 species were recorded under family Araneidae, followed by 15 species under Salticidae, seven species under Oxyopidae, five species under Tetragnathidae, four species under Thomisidae, three species each from Lycosidae and Theridiidae. One species each were recorded from Agelenidae, Ctenidae, Hersiliidae, Miturgidae, Nephilidae, Pholcidae, Pisauridae, Scytodidae, Uloboridae and Zodariidae (Table 2).

From a total of 40 species of spiders from Dangar Devi, a maximum of 11 species each were recorded under family Araneidae and Salticidae, followed by 5 species under Tetragnathidae, 3 species under Lycosidae, 2 species each under Oxyopidae and Theridiidae. One species each was recorded under the family Agelenidae, Ctenidae, Eresidae, Hersiliidae, Nephilidae, and Pholcidae (Table 2).

From a total of 39 species of spiders from Galaput, a maximum of 10 species was recorded under family Araneidae, followed by 8 species under Salticidae, 4 species under Tetragnathidae, 3 species under Lycosidae, 2 species each under Oxyopidae, Theridiidae, and Thomisidae, one species each under Agelenidae, Ctenidae, Eresidae, Hersiliidae, Nephilidae, Pholcidae, Pisauridae, and Uloboridae (Table 2).

From a total of 38 species of spiders from Bhairab Guda, a maximum of 11 species was recorded under family Araneidae, followed by 8 species under Salticidae, 5 species under Tetragnathidae, 3 species under Lycosidae, 2 species each under Oxyopidae and Theridiidae, 1 species each under Agelenidae, Ctenidae, Eresidae, Hersiliidae, Nephilidae, Pholcidae, and Thomisidae (Table 2).

From a total of 37 species of spiders from Mauli Maa, a maximum of 10 species was recorded under family Araneidae, followed by 8 species under Salticidae, 5 species under Tetragnathidae, 3 species under Lycosidae, 2 species each under Oxyopidae, and Theridiidae, one species each under Agelenidae, Ctenidae, Eresidae, Hersiliidae, Nephilidae, Pholcidae, and Thomisidae (Table 2).

From a total of 36 species of spiders from Alligam, a maximum of 11 species was recorded under family Araneidae, followed by 7 species under Salticidae, 4 species under Tetragnathidae, 3 species under Lycosidae, 2 species each under Oxyopidae and Theridiidae, one species each under Agelenidae, Corinnidae, Ctenidae, Eresidae, Hersiliidae, and Nephilidae (Table 2).

Spiders common to all study sites

A total of 28 species of spiders under 11 families (7 species under Saliticidae followed by 6 species under Araneidae, 4 species under Tetragnathidae, 3 species under Lycosidae, 2 species under Oxyopidae, and one species each under Agelenidae, Ctenidae, Hersiliidae, Nephilidae, Pholcidae, and Theridiidae) were common to all the study sites (Table 2).

Exclusive distribution of spiders in study sites

Among the 81 species of spiders recorded in the six study sites, 25 species (30.86% of the total) under 10 families were exclusively recorded from Kanta Baunsuni sacred grove. Out of these, highest number of 7 species recorded under family Araneidae, followed by 5 species under Oxyopidae and Salticidae, 2 species under Thomisidae, one species each under Eutichuridae, Miturgidae, Pisauridae, Scytodidae, Tetragnathidae, and Zodariidae (Table 2, Fig. 4).

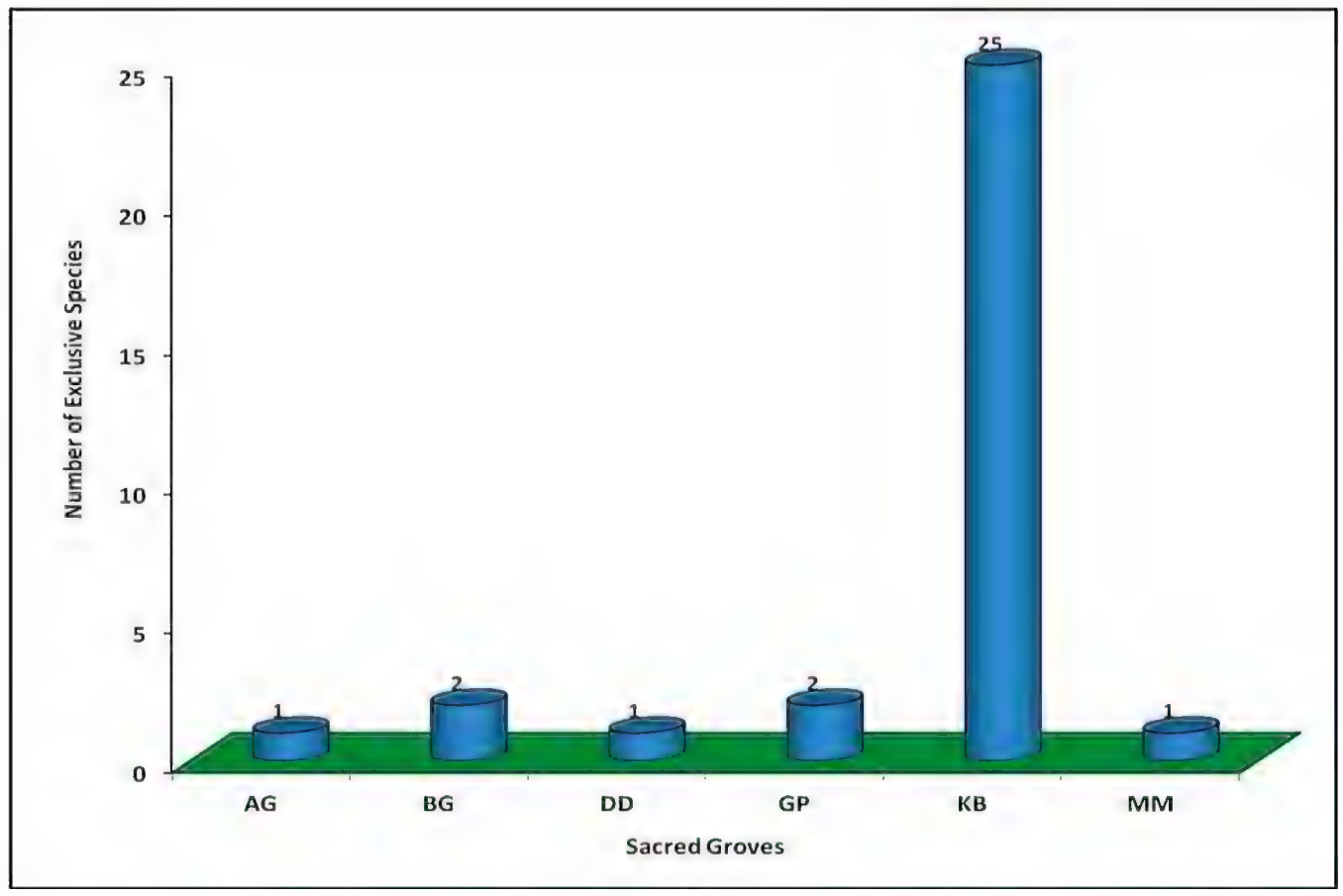

Fig. 4. Distribution of exclusive species of spiders in six sacred groves in Koraput district, southern Odisha, India.
(AG: Alligam, BG: Bhairab Guda, DD: Danger Devi, GP: Galaput, KB: Kanta Bausuni, MM: Mauli Maa)

Few exclusive species of spiders have also been recorded from other five sacred groves, *i.e.* one species from Alligam (AG) (genus *Castianeira*, family Corinnidae), 2 species from Bhirab Guda (BG) (genus *Cyclosa*, family Araneidae and genus *Thomisus*, family Thomisidae), one species from Danger Devi (*Asemonea tenuipes*, family Salticidae), two species from Galaput (genus *Araneus*, family Araneidae and *Dendrolycosa robusta*, family Pisauridae), and one species from Mauli Maa (*Cyrtophora feai*, family Araneidae) (Table 2, Fig. 4).

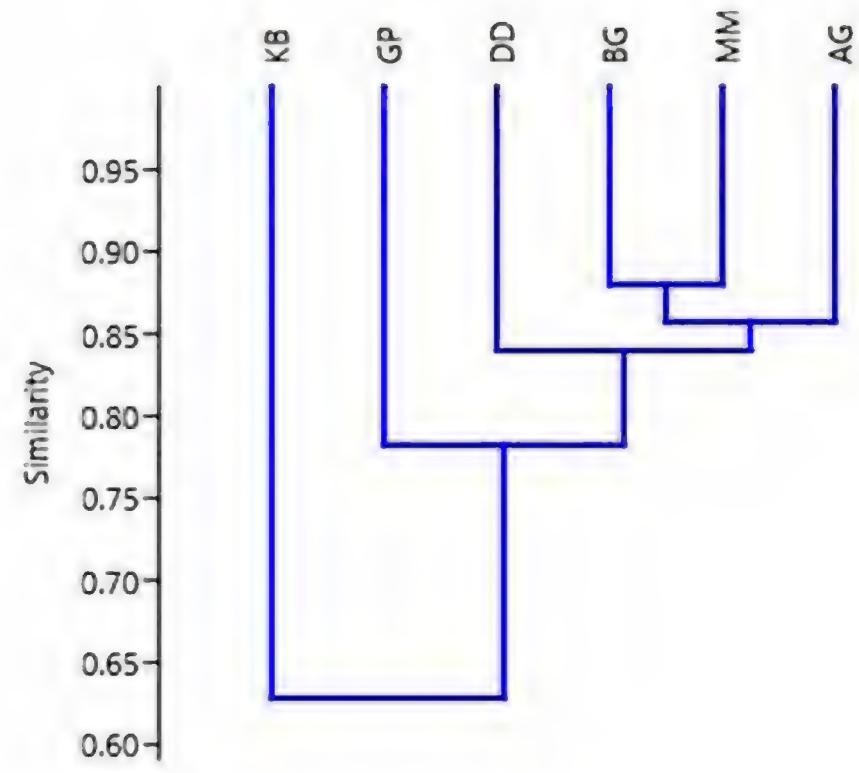

Fig. 5. Dendrogram showing Bray Curtis Cluster Analysis of distribution of spiders in six sacred groves in Koraput district, southern Odisha, India.
(AG: Alligam, BG: Bhairab Guda, DD: Danger Devi, GP: Galaput, KB: Kanta Bausuni, MM: Mauli Maa)

Cluster analysis based on the Bray-Curtis paired linkage revealed the percentage of similarity in distribution of spiders among different sacred groves are presented in Fig. (5). The dendrogram showing the similarity forms five clusters: 1. Mauli Maa and

Bhairab Guda sacred groves in one cluster with 88% similarity. 2. Mauli Maa, Bhairab Guda, and Alligam in one cluster with 86% similarity. 3. Danger Devi with three others, *i.e.* Bhairabguda, Mauli Maa, and Alligam in one cluster with 84% similarity. 4. Galaput with four others, *i.e.* Danger Devi, Bhairab Guda, Mauli Maa, and Alligam with 79% similarity. 5. Kanta Bausuni sacred grove forms a separate cluster with 63% similarity with others (Fig. 5).

Generally spiders live in precisely defined ecological conditions limited by abiotic factors such as humidity, intensity of light, temperature, wind flow and biotic factors such as vegetation type, availability of food, inter-specific and intra-specific competition (Foelix, 2011). As the sacred groves have relatively undisturbed ecological conditions more than their surroundings, these limiting factors promote presence of a wide diversity of spiders in the sacred groves.

Record of 81 species in the present study is the maximum number of species of spiders recorded from sacred groves in India. Record of maximum 67 species of spiders from Kanta Bausuni sacred grove (KB) with 25 exclusive species speaks of species richness of this grove. Due to sacred belief of people and well-defined boundary, plants remain almost untouched even though deities are visited by people. May be due to these factors, sacred groves have been protected from external disturbance which resulted in high plant density under different families thereby increasing the diversity of spiders. This result is consistent with the earlier report of Rypstra *et al.* (1999), who demonstrated that density of spiders was positively correlated with biomass of weeds. Further, spider assemblages is directed by plant communities and correlated with vegetation cover (Churchill & Ludwig, 2004; Sivaperuman, 2008).

Conclusion

Biodiversity and its conservation in sacred groves is a less studied area of research. However, record of 81 species of spiders from six sacred groves in Koraput of southern Odisha is a first step towards understanding the rich faunal diversity of sacred groves. Further, this is also the maximum number recorded species of spiders in sacred groves in India. These findings, further confirms the growing evidence that sacred groves are potential storehouses of biodiversity. Spiders are ecological indicators, therefore, from conservation point of view more systematic studies are required to be undertaken in future on spider diversity and their relationships with plant assemblages in sacred groves.

Acknowledgments

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First report of comb-footed spider *Parasteatoda kompirensis* (Bösenberg & Strand, 1906) (Araneae: Theridiidae) from India with comments on taxonomic variations

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Abstract

Parasteatoda kompirensis (Bösenberg & Strand, 1906) was previously reported from China, Korea and Japan. In this paper, we report the female of this cobweb spider from India. A detailed taxonomic description of the female is here provided.

Keywords: First report, taxonomy, *Parasteatoda kompirensis,* India.

Introduction

The cobweb spider family Theridiidae Sundevall, 1833 is represented by 124 genera and 2487 species in the world (World Spider Catalog, 2018). The family is poorly studied in India and till date only 29 genera and 79 species of this family are reported from India (World Spider Catalog, 2018). The genus *Parasteatoda* Archer, 1946 was first reported from India more than a decade ago (Ganeshkumar & Siliwal, 2007). Though the genus is spacious and includes 42 species and 2 subspecies from all over the world, only three species: *P. brookesiana* (Barrion & Litsinger, 1995), *P. celsabdomina* (Zhu, 1998) and *P. oxymaculata* (Zhu, 1998) have been reported from India (Ganeshkumar & Siliwal 2007; Rajoria, 2016; World Spider Catalog, 2018). Herein, we report *Parasteatoda kompirensis* (Bösenberg & Strand, 1906) for the first time from India based on females. This species was previously reported from China, Korea and Japan (World Spider Catalog, 2018). We also provide information on morphological taxonomic characters of the species.

Material and Methods

The specimens were collected by hand picking and preserved in 70% ethyl alcohol with little glycerin. Measurements of body parts were taken with a Mitutoyo™

Vernier caliper. Leg measurements were taken dorsally for the left side. All measurements were taken in millimetres. Genitalia were dissected and cleared in concentrated lactic acid in 100°C water bath for 15-20 minutes. Images were taken by a digital camera attached to an Olympus SZX10 stereo-zoom microscope.

Abbreviations used: AER = anterior eyes row, AL = abdomen length, ALE = anterior lateral eye, AME = anterior median eye, AW = abdomen width, CL = cephalothorax length, CW = cephalothorax width, MOQ = median ocular quadrangle, PER = posterior eyes row, PLE = posterior lateral eye, PME = posterior median eye, TL = total length. All specimens were deposited at Indraprastha University Museum (IPUM), New Delhi, India.

Taxonomy

Theridiidae Sundevall, 1833

Parasteatoda Archer, 1946

Parasteatoda kompirensis (Bösenberg & Strand, 1906) (Figs. 1-11, Table 1)

Theridion kompirense Bösenberg & Strand, 1906: 141, pl. 5, f. 41, pl. 12, f. 284.

Achaearanea kompirensis Yoshida, 1983: 41.

Parasteatoda kompirensis Yoshida, 2008: 39.

Material examined: 2♀♀, IPU-Arach-97, IPU-Arach-98, GGSIPU campus, Delhi, India (28°35'39.89"N, 77°01'14.52"E), 07.03.2014, Coll. Shubhi Malik; 1♀, IPU-Arach-307, GGSIPU campus, Delhi, India, 17.04.2015, Coll. Shubhi Malik; 1♀, IPU-16-ARA-0271, Ampani Ghati, Kalahandi, Odisha, India (19°31'29.1"N, 82°35'50.2"E), 27.09.2016, Coll. Sudhir Ranjan Choudhury.

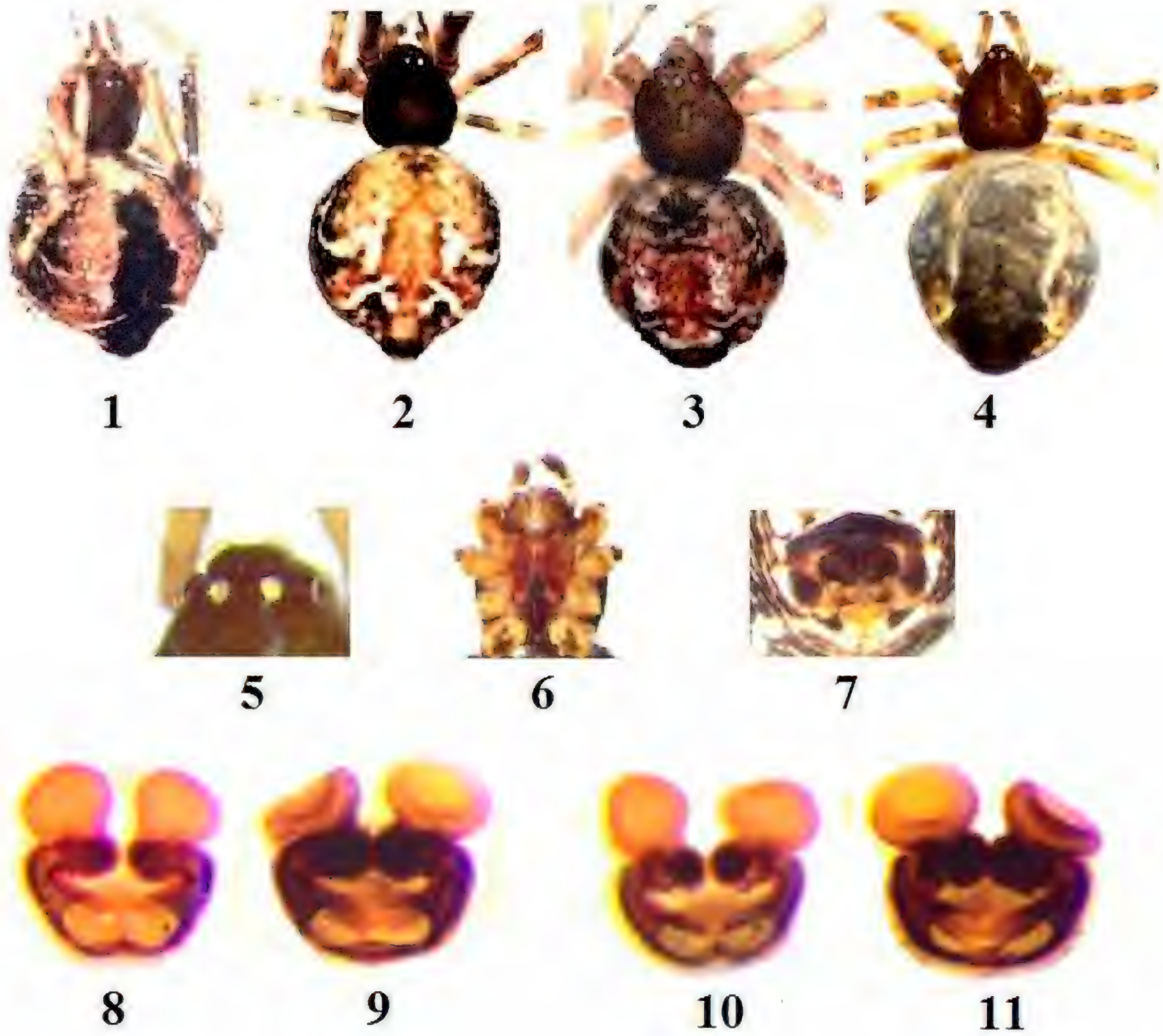
Description, Female (Figs. 1-11): TL 4.30-5.82±0.64, CL 1.50-1.62±0.06, CW 1.15-1.40±0.11, AL 2.80-4.20±0.62, AW 2.20-3.01±0.38.

Carapace uniformly yellowish-brown, longer than wide, thoracic area broader than cephalic area, cephalic region narrowed in front, thoracic area glabrous, darker at margins and fovea present (Figs. 1-4). Eight eyes, all transparent except PMEs are white, AER strongly recurved and PER nearly straight, ALEs largest and PMEs smallest (Fig. 5), MOQ equal in length and width. Eyes inter-distances: AME-ALE 0.07-0.10±0.01, AME-AME 0.08-1.00±0.15, PME-PME 0.09-0.20±0.06, PME-PLE 0.06-0.14±0.04. Labium dark yellow and as long as wide, endites also dark yellow, but slightly longer than wide, sternum shield-shaped, yellowish-brown and longer than wide (Fig. 6). Legs yellow in colour and with dark annulations, leg formula 1423 (Table 1).

Abdomen nearly spherical, longer than wide and with a short posterior projection. Colour pattern highly variable with dark brown or blackish basal colour; dorsum with yellowish brown or dark brown or blackish broad median longitudinal band and many silvery and blackish transverse flecks on both sides (Figs. 1-4); sub-triangular and mound-like in lateral view and ventrally with ventro-lateral black bands. Spinnerets close to each other, conical towards posterior ends (Fig. 7).

Epigynum (Figs. 8-11) has pear-shaped, nearly spherical or hemispherical sclerotized spermathecae and large circular orifices with sclerotized rims and two openings on both sides (Figs. 8-9). Vulvae consist of a pair of pear-shaped or nearly spherical or hemispherical spermathecae with long, curved and thick copulatory ducts twisted near spermathecal heads. Fertilization ducts short or moderately long (Figs. 10-11) extending into the atrium.

Variations were observed for abdominal colour patterns (Figs. 1-4), spermathecal shape and length of fertilization ducts (Figs. 8-11), however such variations are not uncommon for the species (Song *et al.,* 1999; Yoshida, 2000, 2008, 2016).



Figs. 1-11. *Parasteatoda kompirensis* ♀. 1-4. Habitus, dorsal view. 5. Eye arrangement. 6. Sternum, endites and labium. 7. Spinnerets. 8-9. Epigynum, ventral view. 10-11. Vulvae, dorsal view.

Table 1. Legs measurements (range ± SD) of *Parasteatoda kompirensis* ♀ (n = 4).

	Leg I	Leg II	Leg III	Leg IV	Palp
Femur	1.80-2.56 ±0.31	1.30-1.80 ±0.23	0.80-1.20 ±0.19	1.20-2.00 ±0.38	0.20-0.50 ±0.14
Patella	0.30-0.78 ±0.21	0.15-0.61 ±0.22	0.10-0.59 ±0.21	0.20-0.57 ±0.16	0.10-0.21 ±0.17
Tibia	1.30-1.95 ±0.27	0.70-1.14 ±0.18	0.50-0.70 ±0.09	0.90-1.51 ±0.26	0.10-0.26 ±0.07
Metatarsus	1.00-3.07 ±0.89	0.60-1.72 ±0.49	0.60-1.05 ±0.21	1.00-1.99 ±0.43	---
Tarsus	0.60-1.00 ±0.20	0.50-0.74 ±0.10	0.40-0.80 ±0.17	0.53-0.80 ±0.11	0.40-0.53 ±0.06
Total	5.00-9.36 ±0.73	3.25-6.01 ±0.48	2.40-4.34 ±0.28	3.83-6.87 ±0.55	0.80-1.50 ±0.13

Natural history: They are commonly found in leaf litters.
Distribution: China, Korea, Japan and India (present record).

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A new record of *Salticus* from Turkey (Araneae: Salticidae)

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Abstract

Salticus propinquus Lucas, 1846 is identified as a new record for the Turkish araneofauna. Its morphology is briefly described and illustrated.

Keywords: Araneae, Salticidae, *Salticus*, fauna, new record, Turkey.

Introduction

Salticidae Blackwall, 1841 is the largest family in Araneae and is currently represented by 6069 species belonging to 636 genera in the world (World Spider Catalog, 2018). There are 143 species in 42 salticid genera listed for Turkey (Bayram *et al*., 2017; Demir & Seyyar, 2017). So far, seven species belonging to genus *Salticus* Latreille, 1804 have been reported from Turkey (Topçu *et al*., 2005; Bayram *et al*., 2017; Demir & Seyyar, 2017). In this study, *Salticus propinquus* Lucas, 1846 is recorded for the first time from Turkey. Therefore, the known species of genus *Salticus* Latreille, 1804 is raised to eight in Turkey.

Material and Methods

A specimen was collected from Mediterranean Region (Mersin) by means of hand aspirator from stony ground and preserved in 70% ethanol. SZX16 Olympus binocular stereomicroscope was used during identification. Identification depended on Metzner (1999) and Prószyński (2003). Examined specimen was deposited in the Arachnology Museum of Ömer Halisdemir University (NOHUAM). World distribution of the new record follows the World Spider Catalog (2018).

Results

In this study, *Salticus propinquus* Lucas, 1846 is recorded for the first time from Turkey. Therefore, the known species of genus *Salticus* Latreille, 1804 is raised to eight in Turkey. The total number of this family recorded from Turkey is now 144 species.

Salticus propinquus Lucas, 1846
Material examined: 1♀, Mersin Province, Tarsus District, Çamalan-Çamlıyayla road (36°50'32.7"N, 34°31'37.1"E), 20.04.2007.
Description: Body length 5 mm (Fig. 1). Prosoma dark brown with whitish stains behind eyes and eye field. Opisthosoma dark brown with three white horizontal bands. Legs yellowish with dark brown bands. Epigyne rectangular with U-shaped spermathecae (Fig. 2).
World distribution: Mediterranean (World Spider Catalog, 2018).

1 2

Figs. 1-2. *Salticus propinquus* Lucas, 1846 ♀. 1. habitus, dorsal view. 2. vulvae, dorsal view. Scale bars: 1. 1 mm. 2. 0.1 mm.

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A new record of genus *Inermocoelotes* from Turkey (Araneae: Agelenidae)

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Abstract

Inermocoelotes falciger (Kulczyński, 1897) of family Agelenidae is recorded for the first time from Turkey. The studied material was collected from Kırklareli province of Turkey. Its morphology is briefly described and illustrated.

Keywords: Araneae, Agelenidae, *Inermocoelotes falciger*, new record, Turkey.

Introduction

Family Agelenidae is represented by 77 genera and 1275 species in the world (World Spider Catalog, 2018). Within Turkish spider fauna, with a total of 52 families and 1117 species, Agelenidae is represented by 61 species of 12 genera (Bayram *et al*., 2017; Demir & Seyyar, 2017). This paper deals with the characteristic features and distribution of *Inermocoelotes falciger* (Kulczyński, 1897) adding a new species to the araneo-fauna of Turkey; the second species of genus *Inermocoelotes* in the country.

Material and Methods

One female specimen was examined in this study. It was collected by means of a hand aspirator from under stones among plants. Identification was made by use of Leica S8APO stereomicroscope using Wang *et al.* (2010) for comparison. The specimen was photographed by a Leica DC160 camera attached to a Leica S8AP0 stereomicroscope. Images were montaged using "CombineZM" image stacking software and "Photoshop CS5" image editing software. Measurements are given in millimetres. The studied

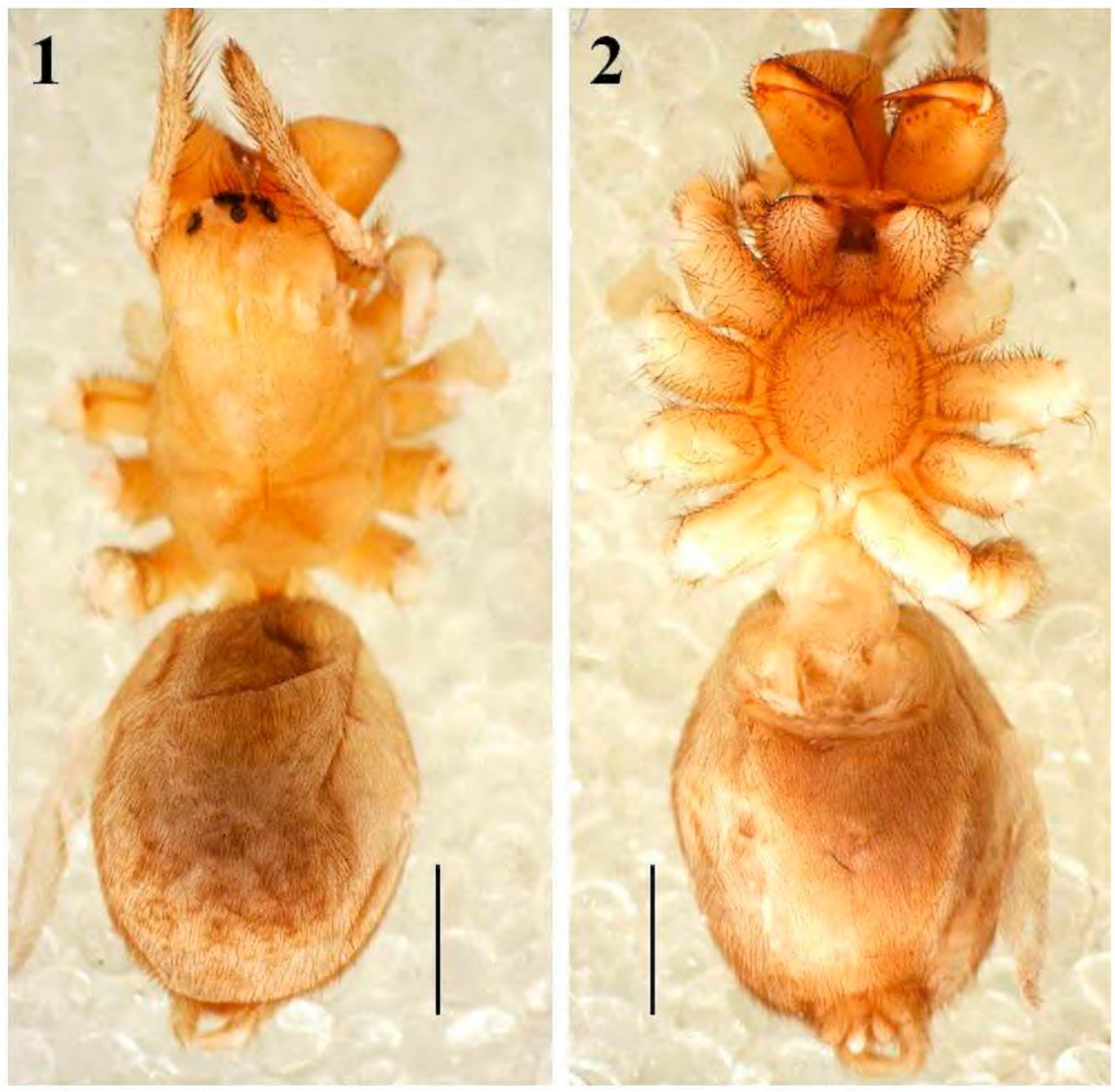
specimen is preserved in 70% ethanol and deposited in the collection of the Arachnological Museum of Kırıkkale University (KUAM).

Results

Inermocoelotes falciger (Kulczyński, 1897)
Material examined: 1♀, Kırklareli Province, Demirköy village (41°49'24"N, 27°45'39"E), 10.09.2016.

Distribution: Eastern Europe (World Spider Catalog, 2018).

Description. ♀ (Figs. 1-2) Total length 13.70. Prosoma 6.70 long, 3.60 wide. Opisthosoma 7.0 long, 5.10 wide. Prosoma elongate, yellowish brown, moderately narrowed in ocular area, longitudinal fovea moderately depressed. Ocular area light brown with short dark hairs. Chelicera yellow, its dorsal part with sparse short black hairs, prolateral part with intensively long dark hairs (Fig. 3). Abdomen yellowish brown with dark hairs. All legs light yellow. Epigyne characteristic, as in Figs. (4-5). Atrium dome-shaped. Epigynal teeth relatively long, posteriorly arising between atrium and epigastric furrow, separated by approximately atrial width. Copulatory ducts anteriorly originate, extending and connecting to spermathecae laterally. Spermathecae short and broad, slightly extending and converging anteriorly. Fertilization ducts small (Figs. 4-5).



Figs. 1-2. *Inermocoelotes falciger* (Kulczyński, 1897) ♀, habitus.
1. Dorsal view. 2. Ventral view. Scale bars: 2.0.

Fig. 3. *Inermocoelotes falciger* (Kulczyński, 1897) ♀, frontal view, showing chelicerae and ocular area. Scale bar: 0.5.

Figs. 4-5. *Inermocoelotes falciger* (Kulczyński, 1897) ♀, epigyne. 4. ventral view. 5. dorsal view. Scale bar: 0.5.

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